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MONTANA OUTDOORS

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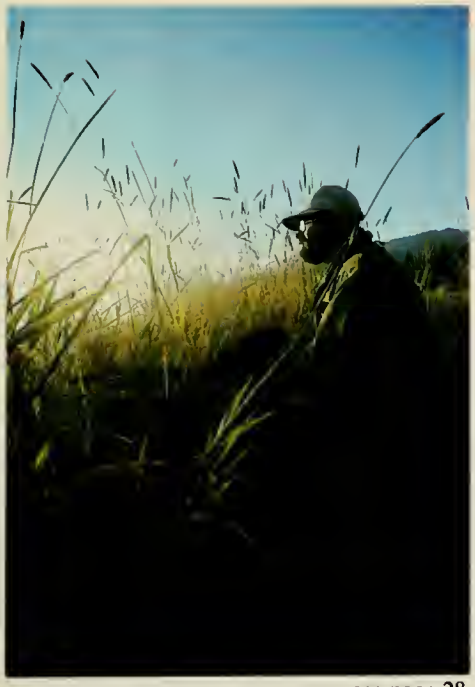

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Sept./Oct. 1986
Volume 17, Number 5

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COVERS

If anything could make you cherish fall days afield, Bill McRae's front cover photograph of a heavy-antlered whitetail deer is that thing. Pheasants, farmyards, and fall are a time-honored partnership, beautifully melded in Dave Maloney's inside front cover painting. Lest you think we have ignored waterfowl in the panorama autumn proffers, consider William K. Vinje's back cover photograph of a canvasback.

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IN SEARCH OF A

by Mike Aderhold
illustrated by Robert A. Kercher

Working together, the Northwest Power Planning Council, the region's public and private utilities, the Bonneville Power Administration (BPA), the Bureau of Reclamation (BOR), the Corps of Engineers (COE), the the area's Indian tribes, the U.S. Forest Service, the National Park Service, and the Department of Fish, Wildlife and Parks (DFWP) are engaged in a comprehensive fish and wildlife research and management project of major importance to the state of Montana.

The effort is part of a four-state program to fulfill the congressional mandate to combine the Pacific Northwest's need for more energy with the region's popular and growing interest in protecting and enhancing its valuable fish and wildlife. The overall objective is to break with the costly and wasteful energy vs. wildlife battles of the past by developing a regional, environmentally sound cooperative approach to future energy development and production.

In the past, research in this area has been secondary, since most management effort has been geared to monitoring and surveying the rise and fall of populations, setting seasons, and protecting habitat. This work is usually done by widely separated individuals working alone. There are just not enough resources for team study of involved problems over a prolonged period.

That it is possible now is a tribute to farsighted and unorthodox thinking and a congressional compromise called the Pacific Northwest Electric Power Planning and Conservation Act of 1980. This legislation and the help of 8 million residents in the Pacific Northwest has brought us to the dawn

"Lake Country Fantasy"

ETTER BALANCE

of something that should benefit everyone living in the Columbia River Basin.

Tourism and wildlife-oriented recreation is now Montana's No. 4 industry (behind agriculture, wood products, and mining). According to the Montana Department of Commerce, it's worth about $900 million a year to Montana's economy. The condition of the natural resources that support this industry is of concern not only to hunters and fishermen, but also to the thousands whose work and quality of living depend on them.

With this in mind, planners, political representatives, and experts in energy production and natural resource management are coming together under the authority of the Northwest Power Planning Council to try to address long-standing fish and wildlife problems associated with hydroelectric development.

In the United States, we are beginning to appreciate the correlation between energy availability, jobs, and respect and concern for our natural resources. The healthier our whole economy is, the more we tend to put our protective feeling for land into action. So it behooves those concerned with the well-being of fish and wildlife to take an interest in the conservation, production, and availability of energy and its impact on the area's economy.

Most fish and wildlife research under the act in Montana has been directed toward assessing the environmental impacts of on-line hydroelectric developments, and preparing specific plans to offset some never-addressed losses. To date, the DFWP has been involved in 12 projects: four wildlife and eight fishery contracts. The Confederated Salish and Kootenai tribes have two other contracts to study fish and wildlife on their reservation. Work has centered on fisheries, game, and rare animal populations affected by Thompson Falls, Noxon Rapids, and Cabinet Gorge dams in the Clark Fork drainage; Hungry Horse and Kerr dams in the Flathead Valley; and Libby Dam in the Kootenai drainage.

Two of these research efforts were completed in 1985. In one of them, a 2½-year case study in the Swan River drainage to evaluate the potential cumulative impacts of many proposed "mini" hydroelectric projects, researchers intensively surveyed about 260 miles of fish habitat. They found that construction of all proposed mini hydro projects would divert water from 13% (34 miles) of the total, resulting in potential cumulative losses of 23% of the high quality habitat for bull trout, 19% for cutthroat trout, and 6% for brook trout in the Swan Valley. Development can now be considered with an understanding of what is at stake.

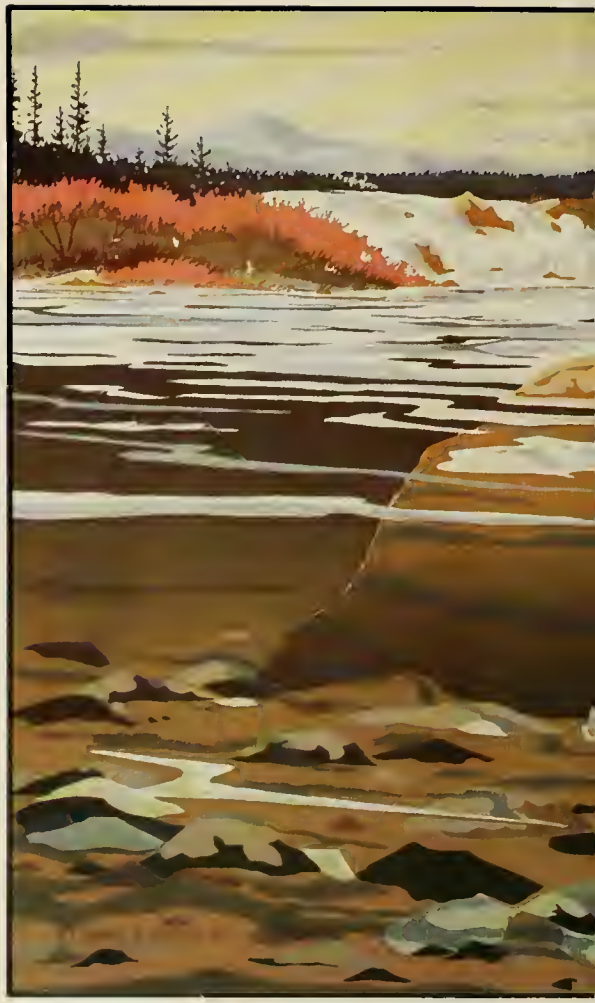
The other project completed was a three-year assessment of the impacts of the Lower Clark Fork, Libby, and Hungry Horse dams and reservoirs on big game, game birds, furbearers, and raptors and their habitat. Losses were quantified, using the most reliable historical information available. Researchers documented previous mitigation efforts in detail. Out of this has come a recent proposal to mitigate some of the wildlife losses connected to construction of the Hungry Horse project.

Of the 10 projects still under way, the most publicized—over 60 articles—have been two efforts to evaluate the impacts of Kerr Dam near Polson and Hungry Horse Dam on Flathead Lake and the Flathead River. Researchers irrefutably tied the dramatic decline of kokanee in the late 1970s to management of Hungry Horse Dam for peaking power. The DFWP proposed changes in the facility's operation to the Northwest Power Planning Council in 1981, based on studies funded by the BOR. The Northwest Power Planning Council adopted them, and the BOR operators at Hungry Horse Dam adjusted the discharge—and salmon production began to increase in 1983.

Two other research teams are trying to determine what kind of reservoir management at Libby and Hungry Horse dams would best serve the area's sport fisheries. These biologists are also looking at implications of various basin-wide reservoir operation proposals on water levels in Libby and Hungry Horse reservoirs. Once the value and potential of these fisheries can be established, then the costs, benefits, and trade-offs of various alternatives can be evaluated; the object is to find a better balance between fish and wildlife resources and other project purposes such as power production, flood control, navigation, and irrigation.

Two related projects involve study of the fish populations and flows in several important Kootenai River tributaries and an evaluation of the quality and quantity of fish habitat in the South Fork drainage flooded by Hungry Horse Reservoir. The Kootenai effort is aimed at determining the in-stream flow needs required to maintain the existing fishery and to evaluate spawning use, potential fish passage problems, and the water available for irrigation. The South Fork research is concentrating on fish movement from Hungry Horse Reservoir to adjacent spawning tributaries. The South Fork project will evaluate mitigation alternatives for lost fish production.

One experimental program now in place is the purchase of water behind Painted Rocks Reservoir at the southern end of the Bitterroot Valley. This is under consideration as possible off-project mitigation for construction of Thompson Falls Dam. The idea is to improve the fishery in the Bitterroot, to offset an irreplaceable fishery loss in the Clark Fork. This



management plan is nearly complete and has been supported by local agricultural and recreation interests. The Montana Power Company, owner of Thompson Falls Dam, recently began negotiations for a long-term water purchase to satisfy mitigation under the Northwest Power Act.

Another study is trying to determine the environmental significance of river segments and river systems throughout Montana. Values considered include fish and wildlife populations, recreational potential, unique natural and cultural features, and potential for future energy development. This study will produce an information base that is consistent, verifiable, ongoing, and available for analysis of future development proposals. Similar research is under way in Idaho, Washington, and Oregon.

The last two projects involve Canada geese in the Flathead Valley and a relic population of native bighorn sheep on the east side of Lake Koocanusa (Libby Dam Reservoir). The goose study is a three-year project to weigh the impact of operation of Hungry Horse and Kerr dams on the production and well-being of the Flathead Valley's native Canada goose population. The bighorn sheep project involves logging, burning, fertilization, and earth moving to try and replace some of the herd's original winter range now flooded by the Libby project.

Over 70 biologists and technicians have been involved—as many as 45 at one time. These people are the best available, and they come from 20 states and over 18 different colleges

"Trout Waters"

and universities.

Montana's portion of the Northwest Power Planning Council's comprehensive fish and wildlife program is proportional to its share of the Columbia River Basin. In the whole Pacific Northwest, the BPA is funding over 130 projects. Since 1983, the DFWP has received an average of $1.1 million per year, out of the $30 million to $40 million expended each year on mitigation. This research effort in Montana should be wrapped up some time in 1988. After that, it will be a matter of evaluating, discussing, and implementing the mitigation proposals.

The state has documented much new historical wildlife and fishery information. The kokanee, bull trout, and cutthroat work has been state-of-the-art research at the cutting edge of fisheries expertise. State biologists have worked freely with professionals in other agencies and in other states. The result is an improved working relationship between the DFWP and the Confederated Salish and Kootenai tribes, Glacier National Park, COE, and the BOR. The DFWP now has the best understanding it has ever had of the hydropower industry and the constraints under which it operates.

In the area of agency coordination, computer use, research publication, historical research, public presentations, and team effort, the special projects biologists are establishing new methods and work traditions that have impressed DFWP administrators. Out of the BPA contracts program in recent years have come the current administrator of the DFWP Wildlife Division; the chief of the DFWP's Fisheries Management Bureau; the regional fishery manager in Billings; area (staff) biologists in Dillon, Helena, and Cascade; a hatchery biologist in Anaconda; and others who have gone into teaching, research, and wildlife positions in Montana, but outside the DFWP.

The whole endeavor has included more than the traditional emphasis on harvest and production of game animals. there is a new accent on nurturing and protecting the fish and wildlife support system. The program has the potential to become the most impressive wildlife restoration activity in the world. It is sure to set a standard for similar efforts elsewhere in the country.

The whole Fish and Wildlife Program is not without potential problems. The Northwest Power Planning Council has opened up the planning process in response to the Northwest Power Act's requirement of public involvement. But the Northwest power system is the most complex power system in the world, and the Fish and Wildlife Program is also complicated. Despite dozens of articles on various aspects of the research, it is hard for the public to keep up. Without popular support and public checks, the initial resolve could wane. Cooperation, communication, and mutual understanding are critical.

As consumers, we are now used to electricity and take it for granted. We focus on its uses and benefits and not on what electricity has cost or the debts we have incurred. We

are a generation removed from the original political discussion which led to the decision to make electricity available to everyone. Tremendous amounts of money and natural resources were committed to this objective, and it was always assumed that the benefiting electric rate payer would recover the bulk of this investment.

The 1980 Northwest Power Act compromise was passed to keep the dream of reasonably priced electric power alive. Economic conditions have declined dramatically since the vote was taken. A temporary energy surplus now exists which has softened the resolve to make this program work. The effort is expensive, but it is important to remember the promise it holds for improving everyone's lot in the next century.

By all accounts, the power planning and conservation effort is off to a good start. We now have a respectable regional Fish and Wildlife Program. There are plenty of good ideas on how to bring the two together. The next three years will give us an idea if it's going to work.

* * * * *

A BRIEF HISTORY

The U.S. Army Corps of Engineers (COE) and the Department of Interior's Bureau of Reclamation (BOR) are the principal architects of power development in the West.

The COE was founded in 1802, with the original commission of controlling floods and improving navigation on the nation's navigable rivers. The BOR was established in 1902 to reclaim land in the arid West by providing water for farm irrigation.

The federal power program began in 1906 when Congress authorized inclusion of power facilities in reclamation projects. Initially, the power produced was used for pumping water and was not for sale. Hoover Dam, built on the Colorado River near Las Vegas in 1928, marked the major entrance of the federal government into the business of producing and marketing electric power. During the 1930s, both the COE and the BOR began to build large multipurpose facilities.

Development of the Columbia River's hydroelectric potential during the Depression provided hope for the region's troubled economy. With federal support, Bonneville Dam was completed in 1940, followed by Grand Coulee Dam in 1941. Within 40 years, 30 dams had been built in the Columbia River power system.

Some general principles emerged for the production and marketing of federally produced power. First, all federal power was marketed by the Department of Interior; in the Columbia River Basin, the Bonneville Power Administration (BPA) was set up in 1937 to handle this job. Second, all federal marketing agencies were required to observe "public power preferences" in selling power. Federal installations; city, county, and state power marketing groups; and non-profit rural electric cooperatives have first claim, ahead of private utilities. Third, the Department of Interior was directed to sell power at the lowest possible price to encourage public use of electricity.

Congress' intent was to encourage enough public-power competition for private utilities (both of which have a natural monopoly in their marketing areas) to get lower prices and good service for everyone. This worked, but the result was a bitter rivalry between public and private utilities. Friction developed between states like Washington (served primarily by public utilities) and Oregon (served by private utilities).

The market for electricity grew substantially during the postwar era and almost tripled between 1960 and 1980. The best hydroelectric sites in the Columbia Basin were developed, and this construction had a tremendous impact on fish and wildlife habitat, fish spawning runs, historic sites, and the area's scenic heritage.

As population in the Northwest grew, so did pressure to provide more water and power for municipal and industrial use. Increasing competition created a demand for more power facilities. New power from thermal generating plants, both nuclear and coal-fired, proved to be much more expensive, more than 10 times the cost of existing hydropower.

Problems peaked in the early 1970s when BPA forecasted shortages for the late '70s and '80s. The BPA stopped selling power to private investor-owned utilities in 1973. In 1976, BPA told the public utilities, its preference customers, that it would not be able to meet their additional demands after July 1983. Direct service industrial customers, mostly aluminum companies, were informed that their power contracts with BPA were not likely to be renewed. The Oregon Legislature tried to make the entire state a public utility district to get what it felt was Oregon's share of low-cost power. Numerous lawsuits were filed, and many more were expected if BPA had to divide the anticipated power shortage among its preferred customers.

Wildlife and resident fish were a side issue to start. The initial interest in fish centered on the tremendous 50-year decline of freshwater spawning, ocean-running Pacific salmon (chinook, coho, and sockeye), and steelhead (saltwater rainbow). Populations had dropped off by the millions as the Columbia Basin's hydroelectric system expanded. In trying to help these anadromous fish downstream, problems were created for upstream resident species, kokanee, cutthroat, and bass. Pressure was growing to develop a coordinated plan that would treat the problems of the entire Columbia River Basin and give equitable treatment to fish and wildlife.

The original Pacific Northwest Power Planning bill was submitted in 1977 by the Pacific Northwest Utilities Conference Committee, representing various electric companies and cooperatives. Their bill had utilities doing most of the future power planning. The region's congressmen wanted some politically accountable body, representing *all* the competing entities, charged with electric energy planning. A 1979 version of the power planning bill put the BPA in charge of future planning and allocation.

Those concerned about fish and wildlife were interested in the impacts from existing hydro development. Several West Coast conservation groups were concerned about future energy development. They thought the priority should be on more efficient use of energy—conservation—and not on producing more thermal power plants.

Conservation organizations wanted at least five elements included in any power planning bill: (1) consideration of power conservation as a power production resource, (2) consideration of alternative renewable resources such as solar and wind energy, (3) consideration of the long-term health of the Columbia Basin's anadromous and resident fish

resources, (4) consideration of mitigation for past wildlife losses, and (5) consideration of cost-effectiveness restrictions on any new projects.

Debate in Congress went on for five years. The aluminum companies and direct service industries wanted long-term contracts at rates they could afford. Their old traditional rates were sometimes as low as one-tenth of what electricity costs a residential consumer. These big refineries, however, need a lower rate program if they are to remain competitive in the world market.

Public utilities wanted to avoid a long and expensive legal challenge to their "public power preference" status. Under current rate structures, non-profit electric cooperatives and some other public power marketing groups have a priority claim of BPA power at rates that can be 30% to 40% under what private utilities pay.

Private, investor-owned utilities wanted and needed some of the benefits of a federal low rate program, and BPA needed a financial and political way to get more power on line.

Finally, in the fall of 1980, when the bill had grown to 40 pages and over 13,000 words, everyone got some of what was wanted, it passed, and was signed by President Jimmy Carter in the final days of his administration (Dec. 5, 1980). The new law, PL96-501, the Pacific Northwest Electric Power Planning and Conservation Act, established a four-state (Montana, Idaho, Oregon, and Washington) regional council to plan to provide the power needed by the region's economy at the lowest total cost. The Northwest Power Planning Council was asked to develop a comprehensive regional energy plan emphasizing conservation first; renewable energy, such as wind or solar, second; and third, acquisition of additional coal and nuclear power. Last, the council was to establish a fish and wildlife mitigation and protection program for the Columbia River and its tributaries.

The first Northwest Power bill proposed a 17-member advisory commission with no authority, made up entirely of representatives from utilities. Another idea was to have the governors of Montana, Idaho, Oregon, and Washington meet several times a year and review the power proposals for the Columbia River Basin. Between sessions, they would test the ideas with their constituents and at subsequent meetings decide as a group whether the proposals would serve the region as a whole. The governors, of course, would be familiar with the perspectives of the utilities, industries, conservationists, and tribes in their respective states. And the governors would be true, elected representatives of a state's electric rate payers and recreationists. However, this idea was not practical.

Congress and the governors finally settled on an eight-member council with equal representation from each of the four states. Council members were to be appointed by the governor and represent the people and interests of the various states. The Northwest Power Council would have executive authority over future power development in the Pacific Northwest.

The first Planning Council was formed April 28, 1981. The first chairman was Dan Evans, now U.S. Senator from Washington and former three-term governor of that state. Montana's representatives were Keith Colbo, then director of the Department of Fish, Wildlife and Parks, and Gerald Mueller, formerly with the Utility Siting Division of the Department of Natural Resources and Conservation and a staff member for Gov. Ted Schwinden responsible for lobbying on behalf of Montana when Congress was considering the Northwest Power Act. Colbo is now director of Montana's Department of Commerce; he was replaced on the council by Morris Brussett, former director of the Montana Department of Administration and before that a long-time legislative auditor.

The Pacific Northwest Power Planning and Conservation Act of 1980 directed the Northwest Power Planning Council to *"promptly develop and adopt...a program to protect, mitigate, and enhance fish and wildlife."* The council was to consult with the various states and Indian tribes and is required to maintain a program for public participation. The act explicitly gives the BPA authority and responsibility to use its financial resources to support such an effort.

The first step of the council in 1981 was to request recommendations for a fish and wildlife program from the region's federal and state wildlife agencies, affected Indian tribes, and others interested. These groups were given five months to put together their recommendations. More than 400 recommendations were received. They were reproduced and bound in four volumes—2,200 pages—and distributed throughout the region. Public hearings were conducted in spring of 1982 in Missoula, Boise, Portland, and on the Yakima Indian Reservation.

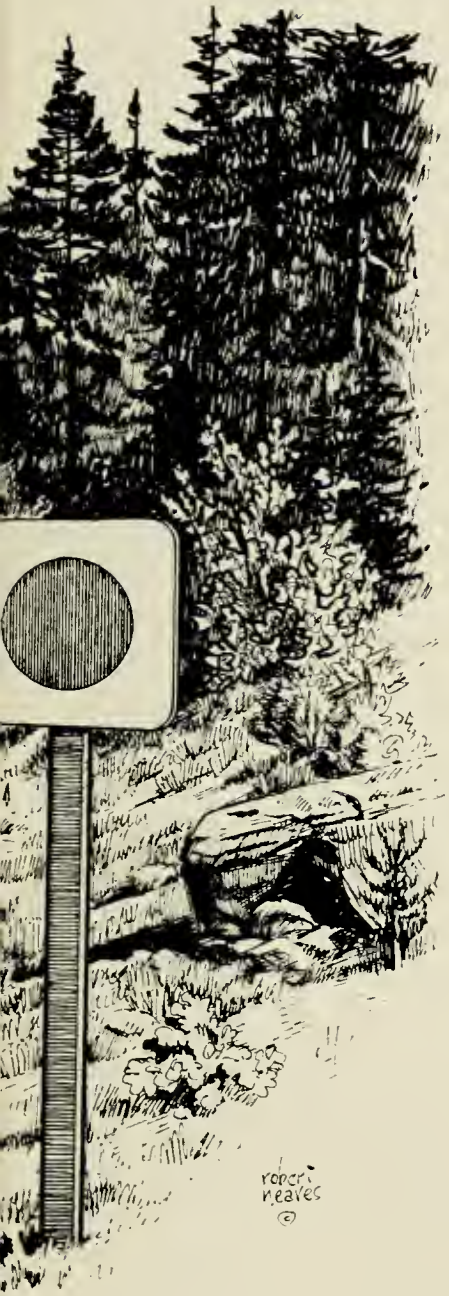
The council appointed a Scientific and Statistical Advisory Committee and this committee and the council then consulted with individual agencies, utilities, tribes, and other interested groups to evaluate the recommendations and comments. Patrick Graham, now head of DFWP's Fisheries Management Bureau, was Montana's representative. Graham put together an informal Montana committee of agency, tribal representatives, and hydro project operators, and they cooperatively developed tentative mitigation ideas which were then presented to Montanans at public meetings in a series of locations. One of the motivations for this cooperation was a concern that downstream interests would dominate and reservoirs in Montana would be operated to aid salmon and steelhead migration downstream—to the detriment of resident fish.

Out of this came a draft Fish and Wildlife Program; 2,300 copies were distributed to major federal and state agencies, interested organizations, and private citizens. Another round of public hearings was conducted in fall 1982. The council received about 5,000 pages of comments from over 600 agencies, tribes, utilities, and individuals. The quantity and quality of these comments reflected the strong interest and commitment the people in the Pacific Northwest have toward solving the region's hydroelectric-related fish and wildlife problems.

In 1982, the BPA established a Division of Fish and Wildlife to implement the Northwest Power Planning Council's new comprehensive Fish and Wildlife Program. To keep the program flexible and responsive to new information, provisions were made to amend the document. The next council review of the Fish and Wildlife Program is scheduled early in 1987. The initial effort is concentrating on the information needed to effectively mitigate for losses to fish and wildlife caused by development of the federal Columbia River Basin power system. ■

Green is for GO

by Jim Cross
illustrated by Robert Neaves



Green dots? Travel management? Does that sound like something in which a wildlife biologist for the Department of Fish, Wildlife and Parks would be involved? Perhaps not in a historical perspective, but definitely in recent years.

For a long time, most people figured the role of regulating public use belonged to land managers. But as access and the number of hunters increased, state wildlife biologists began searching for techniques to preserve or recover some recreation opportunities for big game hunters. The "Green Dot Program" is one such technique, and it is designed to control the amount and direct the distribution of vehicle traffic in specific areas.

For many years, the Department of Fish, Wildlife and Parks (DFWP) has cooperated with federal, state, and corporate landowners in closing roads to protect important big game animals and their habitat. For more than 10 years, the Montana Fish and Game Commission has restricted vehicle use on specific roads on parts of state-owned wildlife management areas.

So what is new about the "Green Dot Program"? It, too, is a road closure program, but it has some advantages. It doesn't matter who owns the land—it can be used on small, private holdings, as well as with mixed land ownership. It is easy to put in place and easier to maintain. It is simple and positive, emphasizing opportunity and OPEN roads.

Creating a "Travel Management Area" is the first step in the "Green Dot Program," and it requires a cooperative agreement among the involved landowners and the department. Reasonable access for public travel is identified, and the department agrees to administer the agreement, including advertisement, publicity, and enforcement.

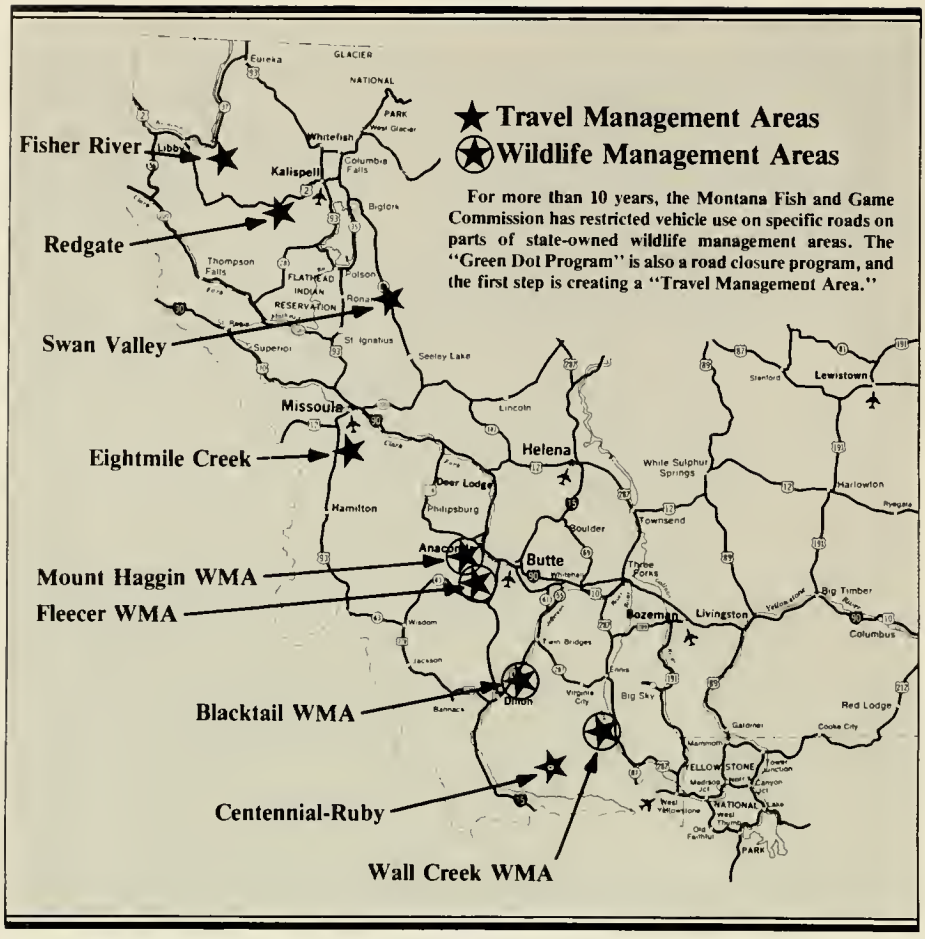
The first thing you will usually see when you enter a green dot system is a sign at the entrance that explains the program and the specific area involved. You will also notice a series of flexible posts, with green reflectors near the top. These posts are placed at road intersections and other appropriate places to designate the road system open to vehicle traffic. The green dot system can help direct vehicle use during any period of the year, but has been used primarily during the general hunting season in October and November; at this time, roads without a green marker are closed. At other times of the year, the green dot has no significance.

Variations of the green dot system have been used in Montana for years. The earliest efforts at restricting vehicle use began on the Fleecer Mountain Wildlife Management Area in 1976. Although a bit different from the "Green Dot Program," this initial effort pioneered the concept of posting roads OPEN for public travel. Over the next few years, this idea was expanded to the Mount Haggin, Blacktail, and Wall Creek Wildlife Management areas.

In 1979, the DFWP coordinated a road closure agreement in the Swan Valley of northwestern Montana with the Flathead National Forest, Montana Division of Forestry (now part of the Department of State Lands), and Burlington Northern, Inc. (now Plum Creek Timber Company) to regulate vechicle use on five separate parcels of mixed ownership, totaling about 64,000 acres. Since then, large parcels of public and private land—in the Fisher River country of northwestern Montana, the Centennial Valley-Ruby River area of southwestern Montana, the Little Bitterroot River area of northwestern Montana, and the Eightmile Creek area of west central Montana—have come under cooperative agreement for travel management.

The primary purpose of the agreements is to reduce the amount of road open to public use during the hunting season. Road density in western Montana can be as high as seven miles of road per square mile of land. A density of one-half mile (or less) of open road per square mile of land can afford high security for elk. A travel management plan improves security and escape qualities of habitat by reducing the disturbance caused by vehicle traffic on forest roads.

The switch to flexible posts and green reflectors was based on a successful program in Oregon. In 1982, under an agreement with the U.S. Forest Service (USFS), the Oregon Department of Fish and Wildlife



designated several large tracts of land for travel management under the green dot system. The primary objectives were to enhance escape habitat for deer and elk and to improve the quality of hunting. In a post-season survey, officials found that 85% of 2,884 hunters surveyed approved of the program. The game was better distributed, hunting improved, and sportsmen said they welcomed the freedom from motorbikes, jeeps, and those who hunt from vehicles. (Because the system reduces the number of open roads, vechicles and those who hunt from them are likely to be less obvious.)

Findings of the 15-year Montana Cooperative Elk-Logging Study documented the need to manage roads to maintain quality elk habitat and security. The study also noted that the effects of habitat loss on elk can be greatly reduced by controlling traffic and closing roads. Because of this, the USFS and the DFWP—independently and jointly—have worked to reduce the number of roads open to vehicle traffic during the general hunting season. Like those in Oregon, Montana biologists found that the traditional method of placing signs to mark all CLOSED roads was very expensive, time consuming, and often irritating to the public. "Closed" signs had to be placed on all secondary roads, trails, and even likely cross-country take-off points, and then they had to be removed after the season each year. In contrast, the green dot system is a one-time posting procedure, since the OPEN road markers remain in place throughout the year.

The system has also worked in the state of Washington. The Washington Department of Game, in cooperation with the USFS, created a green dot management unit on the Wenatchee National Forest. In a post-season evaluation, Washington biologists found that over 75% of the hunters were happy with the green dots, and only 6% were unhappy. Most hunters were quite enthusiastic about the program and felt that such management was overdue. They also thought reduced vehicle travel improved the hunting experience.

Montana sportsmen are also seeing benefits of travel management. Several travel management areas in Montana were converted to the green dot system in 1985. A recent survey of 1,084 hunters at three locations in the Clark Fork area indicated about 34% supported existing travel management levels; more important, an additional 37% favored even more intensive management of public access during the general hunting season.

This past year, the USFS Region One office proposed a cooperative road access management plan between itself and fish and game agencies in Idaho and Montana. The goals include increasing the amount of security available to elk (which protects them from disturbance by vehicles), providing a greater opportunity for observing big game, and increasing the quality and quantity of elk hunting. A key feature of this program, as is also possible with the green dot system, is the opportunity to identify different levels or amounts of access that correspond to different kinds of hunting opportunities. With this capability, biologists and land managers can cooperatively identify levels of access that provide specific hunting opportunities, ranging from unrestricted road hunting to backcountry camp hunting.

Thanks to the Montana Elk-Logging Study and similar research in Idaho, land managers more readily accept the earlier premise that travel management can benefit elk distribution and increase opportunities for elk hunting experiences. In areas like the Swan Valley of northwestern Montana, with its checkerboard land ownership, travel management has benefited white-tailed deer and whitetail hunting experiences. Sportsmen have been highly supportive of the travel management program in the Swan Valley, and the landowners have been very cooperative.

Travel management has the potential to provide diverse recreational experiences for hunters while increasing the use wildlife can make of habitat. Travel management can postpone more restrictive hunting regulations. It is a program that can help keep Montana's forest lands productive for big game. Montana already has over 40,000 miles of forest roads for public use. So the next time you pass a green reflector post in a travel management area, remember the department is trying to maintain or improve hunting opportunities and experiences for you. ■

"Love Nature. . . And Be A Gentleman"

As he carefully handed me the bound roll of papers, Ernest "Dutch" Braunlich started to laugh. "There's a lot o' fish 'n' elk in there! An' a lot o' years chasin' after 'em!"

Once the roll was laid out, we looked at the different colored slips, stamped linen cards, and wallet-sized folded paper. One page read: "If You Forget Your License, Forget Your Rod and Gun!" "Join Your Local Rod and Gun Club," was printed across the top of another. "Give the Game a Square Deal" and "Respect the Ranchman's Property" bordered another document, dated 1926. On the back of yet another piece of colored paper, next to the date 1919, was printed, "Look Before You Shoot!" And finally, on the back of a 1927 membership slip for the Butte Anglers' Club, it read:

* Never in Sport Endanger a human life.
* Obey the Laws of State and Nation, work for better laws and uphold law-enforcing authorities.
* Never be a fish-hog.
* Love Nature and its denizens and be a gentleman.
* One dollar per year plants 2,000 gamefish in our streams each year.

Good words even today—nearly 60 years later. When 86-year-old Dutch Braunlich handed me that roll of papers, it contained more than 70 years of hunting and fishing licenses. In those dog-eared papers, permits, and stamps were almost three-quarters of a century of stories and reminiscences of outdoor life in Montana.

In June, Glenda Bradshaw, exhibits consultant to the Department of Fish, Wildlife and Parks, and I visited Dutch and his sister at their Butte home. It's on Travonia Street, just across the way from the house they grew up in. The purpose of our visit was to accept Dutch's donation of Montana hunting and fishing licenses, big game permits, federal duck stamps, and other sportsman's materials he had collected over the years.

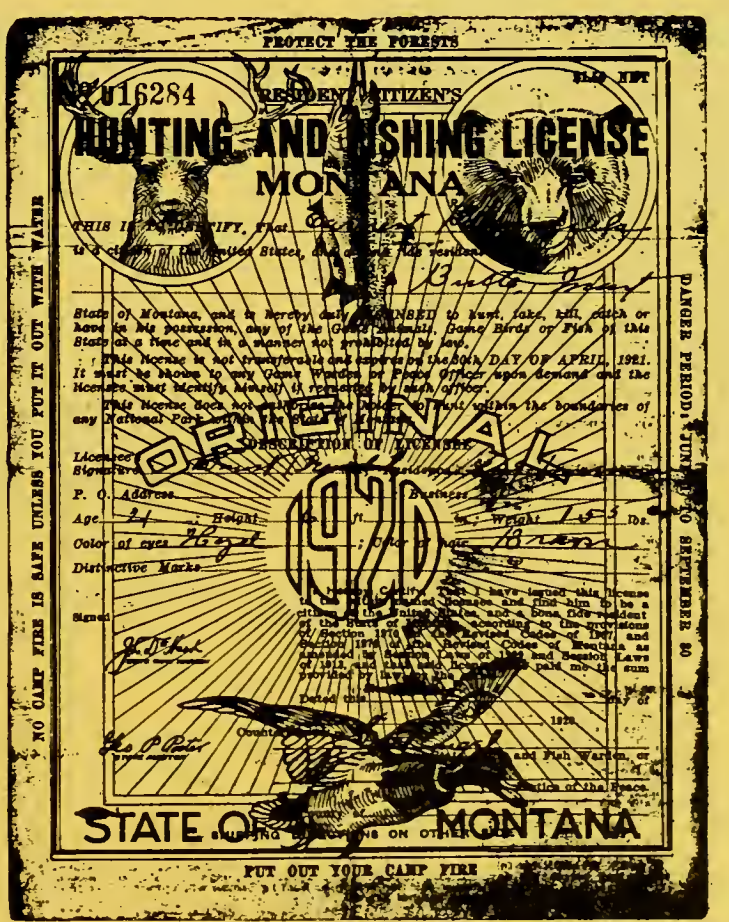
Dutch had a gleam in his eyes and a big smile to accompany his hearty Butte laugh when, glancing through the old papers, his memory was jogged about a particular event or time in his life.

In 1914, Dutch was about to turn 15. That year, he saved his money for two things. He sent his first dollar to Sears and Roebuck for a split bamboo fishing rod. Then, after more saving, Dutch purchased his first "Resident Citizen's Hunting and Fishing License," also for a dollar. That license, the oldest in the group he donated, stated on the legal description that he was "...five feet, four inches tall," with red hair and blue eyes, and weighed 110 pounds—not bad for a fellow who listed his "business" as "teamster." The value of what Dutch got with that license and that mail-order rod, however, far exceeded the sum of $2. Thus began a passion for the outdoors that is as easily stirred today as it was for that kid in 1914. Dutch, incidentally, still has that mail-order fishing rod.

Big game permits, some with the tags torn away, others with one or both ("Class AA Deer" or "Class AA Elk") dangling from semitorn perforations, tell a story of their own. "About 1930," he reminisced, "I started to hunt big game. I hunted elk for 30 years. I almost always got a deer or two, camp meat. But *elk* was what I was after. I bought a Winchester rifle new in 1930 or thereabouts. It was a .30-06 Model 54. I hunted with that gun all my years and still own it. I used to hunt the Big Hole, Vipond Park. We never hunted from cars, 'cause I was out there to see the hills. I could have shot from the car many times, but that's against my religion. But I always got what I aimed at!"

Dutch and his Butte hunting partners would put in a two-week hunting camp. "It was a first-class camp. There was *always* a tub with boiling water going. We were always comfortable." Dutch hunted from horseback and when he or one of his partners had the opportunity to drop the hammer, they'd pack the meat back on saddle stock. "We'd split the elk up and then throw it over the saddle. Cut a couple of holes, one for the seat and another buttonhole to go over the horn. Then we'd turn those horses loose and they'd find their way back to camp. They could pick their way back better than we could ever lead them!"

Other stories came to Dutch's mind when



he saw one elk tag that was blood-spattered and filled out in pencil, obviously by a hand feeling the fall chill. "I wanted to have an elk leather jacket, so I contracted the Eskimo Garment Company back in Wisconsin. They told me I needed four elk hides to make a jacket. For three years in a row, I got an elk, but the fourth year—nothing. It took me five years to get my coat. After the last year, I bundled up the hides and sent them off to Wisconsin.

"In a short time, a huge bundle arrived at the house by express mail. In it were the four elk hides, all tanned. I guess the guys downstairs at the tannery didn't talk to the fella upstairs at the garment factory, 'cause I had to send the hides off again, this time to the address *upstairs*! I sent an old worn-out leather coat along, so they had a pattern for my size.

Ernest "Dutch" Braunlich

"Well, a little while later, another bundle arrives at the house. In it was the new elk leather coat, all the scraps ('cause they never wasted nothin' back then), and my old leather coat completely refinished. All for $15! Well, I liked the old leather coat they'd fixed up so well that I never wore the elk leather coat. I still got that, too."

The classic question: Had Dutch seen a change in the game and fishing in the last 70 years? "Fishing seems to be about the same," he said. "I'm not really sure about these new rules like catch and release, but we'll see. As for big game, it seems better. In those days, 25 or 30 years ago, you could take a whole lot o' game. I've seen pictures of guys up Rock Creek (between Philipsburg and Missoula) with 30 deer strung up at their lodge. In those days, they ate what they killed—but what butchers! Still, with limits down, game seems to have come back."

Dutch worked as a machinist all his life. He apprenticed at the Patterson & Murry Machine Shop and then put in 40 years with the Murry Motor Company, as well as stints with the Hanson Packing Company and with the Army. The Army Air Corps, that is. He retired in 1961, but his "easy days" were short-lived. He offered to help out a friend, Joe Harkins, with his ambulance business and began a two-year return to full-time work. As Dutch put it, "I worked harder in those two years driving an ambulance than I think I did *before* I retired."

The licenses, tags, duck stamps, and other materials Dutch so kindly donated will be considered for an exhibit at the department's new Great Falls regional office, as well as for other exhibits of Montana's outdoor heritage. But no matter where they are used, they will be safely kept so these records of Montana's history will still be around for future generations to see.

The department is looking for other donated artifacts to include in its exhibits. Game warden badges, bounty tags, documents, uniforms, traps, and more make up the list of articles the department is interested in locating. If you have hunting- or fishing-related items you would be willing to donate, contact Glenda Bradshaw or William Phippen at the department's Helena office, 406/444-2535.

Nowadays, getting around is a little tougher for Dutch Braunlich than it used to be. As of late June, he hadn't yet made it out to the Big Hole or the Madison. Then again, the good fishing was just beginning and, after so many years, I guess he doesn't have to beat *everyone* to the banks. Anyway, Dutch reassured me he wasn't about to break a 72-year tradition.—*Michael Korn, director, Montana Folklife Project*

New Committees Foster Communication

The Department of Fish, Wildlife and Parks is establishing local landowner-sportsmen committees throughout Montana to provide a way for direct communication between landowners and

Black or Grizzly Bear?

With hunting seasons opening soon (check with the Montana Department of Fish, Wildlife and Parks, 1420 E. Sixth Ave.; Helena, MT 59620, for details), it is imperative that hunters positively identify their target before shooting. Between 1975 and 1986, the department documented 10 grizzly bears killed because they were mistaken for black bears. These mistakes seriously threaten the limited grizzly bear season in Montana, as well as the spring black bear season.

It is not always easy to distinguish between black and grizzly bears. Color and size are not dependable criteria, so other features must be looked for, such as overall profile, shape of the head, line of the back, and claw length. As a hunter, it is your responsibility to make a positive identification. If you are not sure, don't shoot!

Look for a combination of characteristics to make identification

BLACK BEAR

1. No prominent shoulder hump. Highest point of body is the back.
2. In profile, muzzle is straight and long. Frontally, head and face appear round.
3. Claws dark, much shorter and more curved than grizzly claws.

GRIZZLY BEAR

1. Highest point of back is a muscular hump over the shoulders.
2. In profile, distinct brow gives "dished" look to face. The brow is not as well defined in yearlings.
3. Front claws are long, very prominent, and often light colored. Can sometimes be observed from great distances.

sportsmen, as well as an opportunity to cooperatively discuss and solve local problems.

The first committee was established in Choteau in March, and it comprises four landowners and four members of the Teton County Sportsmen's Association. Communication between members has provided all parties with a better understanding of each other's concerns. It has also resulted in a sportsmen's association project to assist in removing debris accumulated at an old campsite on private property.

Similar committees are being formed in Helena, Kalispell, and Red Lodge.

While not a cure-all for solving concerns associated with public recreational use on private lands, the committees and the communications they foster will provide a means of addressing issues affecting both interest groups.

Rich Clough, the department's landowner-sportsmen relations coordinator in Helena, can provide more information to those interested in this novel approach toward improving landowner-sportsmen relations. Contact him at DFWP, 1420 E. Sixth Ave.; Helena, MT 59620 (406/444-3798).

Upland Game Bird Season Dates

SPECIES	FINAL DATES	BAG & POSSESSION LIMITS
Turkey		
West and Central	Closed	
Bull Mountain District	10/26 - 11/30/86	1 per season
archery	9/6 - 10/25/86	
Southeastern District	9/6 - 11/30/86	1 per season
Mountain Grouse		
Statewide	9/6 - 11/30/86	4 daily; 16 possession
Partridge		
Statewide	9/6 - 12/7/86	6 daily; 24 possession
EXCEPTION 1: Ravalli County closed in its entirety.		
EXCEPTION 2: Closed Area: Those portions of Beaverhead and Madison Counties lying within the following described boundary: beginning at Dillon, thence northerly along State Route 41 to State Route 287 and its junction with the High Road (Twin Bridges - Melrose gravel road) at Twin Bridges, thence westerly along the High Road to its junction with Interstate 15 near Melrose, thence southerly along Interstate 15 to Dillon and the point of beginning.		
Ring-Necked Pheasant		
Statewide	10/18 - 12/7/86	3 daily; 12 possession
Sage Grouse		
West of Continental Divide	Closed	
Southwest	9/6 - 10/19/86	3 daily; 12 possession
Remainder of State	9/6 - 12/7/86	3 daily; 12 possession
Sharp-tailed Grouse		
West of Continental Divide	Closed	
Southwest	9/6 - 10/19/86	3 daily; 12 possession
Remainder of State	9/6 - 12/7/86	3 daily; 12 possession

Deer and Elk May Cause Allergic Attack

Hunters who are allergic to cats and dogs may be susceptible to allergic reactions to deer and elk, according to a study conducted in Montana, where more than 230,000 deer and elk hunting licenses are issued each year.

The reactions can be severe. One study participant was a 29-year-old professional hunting guide and horse packer who experienced several acute attacks of asthma while skinning and dressing deer and elk in the field for his hunting guests.

"His asthmatic reactions seriously interfered with his occupation," said Dr. Donald N. Gillespie of Missoula, Mont., whose study is reported in *Annals of Allergy,* the official publication of the American College of Allergists. Dr. Gillespie's study on the little-researched subject of allergies to wild animals was conducted in cooperation with the Mayo Clinic Allergic Disease Research Laboratory in Rochester, Minn.

The hunting guide, who had a history of allergic rhinitis (hay fever) and asthma, was allergic to a number of other substances, including pollens, molds, dust, feathers, and domestic animal danders. Now, after treatment with medication and a course of immunotherapy, or "allergy shots," his symptoms are controlled and he is back at work in the wild, said Dr. Gillespie.

In another case, the 39-year-old wife of a hunter became violently ill while accompanying her husband on a hunting trip. When a deer carcass was brought into the camp, she developed generalized itching, wheezing, swollen eyes, and sneezing. She was taken to a hospital emergency room and responded to treatment with epinephrine.

Before her allergies to deer and elk were diagnosed, she had suffered some puzzling,

ASK FIRST!!

to Hunt & Fish on Private Land

Getting access to private land is the key to success for thousands of Montana hunters each year. Before hunting or fishing on private land, "Ask First!" Bumper stickers urging that action are available from the Department of Fish, Wildlife and Parks headquarters in Helena, and from regional offices in Kalispell, Missoula, Bozeman, Great Falls, Billings, Glasgow, and Miles City. About 50,000 of the bumper stickers have been distributed to date; 30,000 are available this year—and the department hopes the demand will equal the supply.

milder reactions after handling clothes worn by her husband while he had hunted and killed deer, elk, or antelope.

"Patients with histories suggesting allergy to wild animals such as deer and elk are not unusual in areas of the U.S. where such animals are frequently hunted," said Dr. Gillespie, who found the 15 subjects with deer and elk allergies for his study in his own allergy practice and through newspaper advertisements.

The allergic reactions can be caused, for example, when a sensitive person inhales deer dander, gets a deer hair in an eye, or has skin contact with the animal's urine or serum.

He said the 15 subjects, who were studied over four years, had some common characteristics. Skin and blood tests showed that all had multiple allergies to various substances, and all were sensitive to the dander of at least one domestic animal like a cat or a dog. The latter characteristic, said Dr. Gillespie, suggests that patients who are highly allergic to domestic animals but who have had no contact with deer or elk, may be at increased risk of developing allergic reactions after exposure to deer or elk. This was also suggested by laboratory RAST (radioallergosorbent test) inhibition studies on serum.

Interestingly, none of the 15 subjects reported adverse reactions after eating venison.

Dr. Gillespie cautions hunters allergic to deer and elk to wear gloves and masks when skinning and dressing the game. He also warns them against jumping in the back of an enclosed pickup truck with a carcass for the drive home.—*American College of Allergists*

AG Rules on Hunting Permission

Earlier this year, the Department of Fish, Wildlife and Parks asked Attorney General Mike Greely for his opinion on the following question:

> If a hunter is given permission to enter onto private property to hunt *only* for a specific kind of big game animal, may the hunter be charged with criminal trespass to property or failure to obtain landowner's permission if he exceeds that permission by hunting another kind of animal?

The attorney general held that: "A hunter who has been given permission to enter onto private property to hunt only for a specific kind of big game animal and who exceeds that permission by hunting another kind of animal may be charged with failure to obtain the landowner's permission." In the attorney general's opinion, he states that such a hunter would be subject to prosecution under Sec. 87-3-304, MCA.

The attorney general addressed criminal trespass: "If the permission given is exceeded, the landowner may revoke the privilege to enter or remain upon his land by personal communication to the hunter. However, the hunter does not commit the offense of criminal trespass to property unless he stays on the land after the landowner or some other authorized person has notified the hunter to leave."

FBI Seeks Claude Dallas

Claude Lafayette Dallas, Jr.

The FBI is seeking Claude Lafayette Dallas, Jr., a reported health food enthusiast and avid outdoorsman who has worked previously as a cowboy, trapper, farm hand, ranch hand, gunsmith, and logger.

Dallas, one of the FBI's "Ten Most Wanted Fugitives," is being sought in connection with his March 30, 1986, escape from the Idaho State Penitentiary where he was serving a 30-year sentence for the brutal slayings of two Idaho Department of Fish and Game conservation officers who were killed on Jan. 5, 1981. While resisting arrest for game violations, Dallas shot both officers numerous times at close range before summarily executing them with .22-caliber shots through the temple.

The subject of an intensive fugitive investigation which lasted for 16 months after the 1981 killings, Dallas was apprehended by special agents of the FBI on April 18, 1982, in Paradise Valley, Nev. The apprehension followed a lengthy chase across the Nevada desert between Dallas in a pickup truck and FBI special agents in chartered aircraft, a Huey Helicopter, and bureau vehicles. Dallas, armed with a .30-.30 rifle, a .22-caliber pistol, and a .357 revolver, received minor wounds during an exchange of gunfire with special agents when the chase ended in Paradise Valley.

Born March 11, 1950, in Winchester, Va., Dallas is described as a 5-foot-10-inch, 175-pound white male with brown hair, brown eyes, and a ruddy complexion. He has a bullet wound scar on the outside of his left calf. Dallas has been known to wear long hair, a full beard, and a ponytail in the past. Reportedly a loner who is neat and meticulous in attire, Dallas usually wears western outdoor clothing and wire-rimmed glasses.

Dallas has demonstrated his propensity for violence in the past and should be considered armed, extremely dangerous, and an escape risk. Anyone with information regarding Dallas is requested to take no action other than to contact the nearest office of the FBI, the number of which can be found on the first page of most telephone directories.

NATIONAL HUNTING & FISHING DAY® Sept. 27, 1986

BLEEP . . . BLEEP . . . BLEEP

by Phil Schladweiler

Many people equate the beginning of the Space Age with launching of the first sputnik in 1957. An equally revolutionary "age" in the wildlife field began that same year. It capitalized on rapid technological advances, primarily in aerospace and biomedicine, and it involved applying radio telemetry to the study of free-ranging wild animals and their environments.

The main advantage of radio telemetry is that it (at least potentially) allows biologists to locate individual animals as often as necessary. They can be found day or night, in rain or in sunshine. A few automated systems even track animals minute-by-minute!

In Montana, radio telemetry has been used on wildlife since 1963, primarily to improve management of the various wildlife species. It has helped biologists to gather information almost impossible to get otherwise. It has also enabled them to gather more data, more quickly. When using conventional marking techniques, you never know if you will see the marked animal again. Radio telemetry not only allows relocating marked animals almost at will, but also frequently leads to seeing other conventionally marked animals in the same group as those radio-equipped.

"Telemetry" is the measurement and transmission of data from remote sources to a receiving station. Those data are then recorded and analyzed. A familiar example is the heart monitor commonly seen on television medical shows. "Radio" telemetry means the data are transmitted via radio waves.

Many early users of wildlife radio telemetry seemed to regard it as a status symbol. Most early studies emphasized instruments and techniques rather than the possibility of gathering better information. This early interest at least spurred development of truly usable radio telemetry systems. But biologists soon realized that radio telemetry could not solve ALL wildlife problems. It was a useful tool for obtaining the information necessary to address many management problems or questions.

RANDY HAIGHT

Radio telemetry has made it possible to collect valuable data on the extent, timing, and cause of mortality in newborn deer and elk.

How Does It Work?

Radio telemetry utilizes a transmitter package attached to the animal, and a

receiver and directional antenna for pinpointing the transmitter's location.

The transmitter package includes the transmitter itself, a power supply, transmitting antenna, and the means of attachment. The transmitter contributes a negligible part of the overall weight of all but the very smallest units. The antenna is an integral part of the transmitter and can be shaped like a whip or a loop.

Depending on how it will be used, the transmitter package comes in various sizes, weights, and shapes. Size of the animal on which it will be used largely determines the weight and, to some extent, size. Obviously, larger animals can carry heavier units. Other factors—such as how it will be attached—also influence the overall size.

The power supply is usually the heaviest part of the transmitter package. The most common power source is a storage battery, usually mercury or lithium. Silver-oxide and nickel-cadmium batteries are sometimes used, the latter usually with solar cells which recharge the battery.

Solar cells, like those used in some pocket calculators, are becoming more popular as power sources. They last almost indefinitely, but power transmitters only during daylight. This can be overcome by using them with rechargeable batteries. These batteries contain solar cells which can be recharged, but only a certain number of times.

The life of a transmitter battery depends on its weight and the current it draws. There's a trade-off here, however—you can increase transmission range without increasing battery weight only by increasing current drain, at the expense of the battery's life. Similarly, you can prolong the battery's life only by sacrificing transmission range. In certain wildlife studies, researchers might maximize one of these factors at the expense of the other. For instance, bird migration studies might require long transmission range, but only for a few weeks or less.

The receiving system includes a directional antenna, a battery-operated receiver, and usually a human operator-data recorder. In some cases, especially where researchers need only to know whether a signal is present in a given area or not, a mechanical recorder can be substituted for the human operator. Several reliable

TERRY LONNER

TERRY LONNER

Transmitter packages—which include a transmitter, a power supply, an antenna, and a means of attachment—come in various sizes, weights, and shapes for different animals.

receiver-antenna systems are commercially available for use in wildlife radio telemetry. This variety allows investigators to select the combination which best meets project needs.

Because transmitters operate at discrete (individually distinct) frequencies, each animal can be individually recognized. Earlier receivers had frequency selectors similar to those on a television set, and switching between animals was like changing the TV channel and then fine-tuning the signal. The latest advance is a receiver-scanner. Any frequency the receiver covers can be programmed into the unit, which then scans for each of these until the frequency is deleted or deactivated. This feature is especially useful in aerial radio tracking and/or in searching for animals that may move several miles in a short period of time.

Depending on design, directional receiving antennas give either a sharp signal peak or a null (area of no signal) when pointed directly at the transmitter. the resulting bearing from the receiving station to the animal is generally 2° to 3° wide or less. Factors that influence a bearing's accuracy include the inherent accuracy of the antenna, the investigator's ability to determine the exact point of the null or peak, and signal strength. Distance from the receiver to the transmitter usually determines signal strength.

Greater accuracy comes only by upgrading the system's receiving antenna, which also greatly increases costs. This is usually unnecessary because benefit from this increased accuracy requires maps more exact than those presently available.

What can biologists learn with radio telemetry?

Most radio telemetry studies have a few common objectives: to determine daily activity patterns, seasonal and annual home range sizes, habitat utilization in relation to availability, important or critical seasonal habitats and ranges, and timing and extent of movements between these critical habitats or ranges.

It's easy to understand how important it is for biologists to know these things. For instance, habitat types used significantly more than they occur (i.e., a habitat type occupies 25% of the area, but receives 75% of the area's use) within an animal's home range are obviously extremely important to that species. Management should be geared toward protecting and/or enhancing those important habitats. Biologists must also know about important seasonal ranges such as those used for breeding, nesting, rearing, or wintering, and the travel routes between them.

Some wildlife radio telemetry studies obtain physiological data such as heart rate, body temperature, EKG, EEG, respiration rate, and blood pressure. Most, however, are designed for tracking and periodically locating individual animals.

How are animals tracked?

Researchers use either homing or triangulation to radio track animals. Homing involves moving toward a radio-equipped animal until it is seen, or its location is determined by rapidly changing bearings as you pass it at close range without seeing it. Aerial tracking utilizes homing to pinpoint an animal's location either visually, or to a location identifiable on a map or aerial photo.

Remote locations are made on the ground, using triangulation. Triangulation utilizes the intersection of directional bearings from two or more known locations to determine an animal's position. To avoid errors caused by a moving animal, bearings must be taken simultaneously. This requires two receivers and two operators communicating with one another, or who locate specific animals at prearranged times.

How are transmitters attached?

Methods of attaching transmitters vary widely. With mammals, they are generally attached with neck collars; some "neckless" animals like javelina require a harness. Fish, snakes, and other such animals present special problems, so researchers use implantable or ingestible units. Implanted or ingested transmitters have also been used on other animals; because they have a shorter transmission range than externally mounted units, they usually are not used if the transmitter can be attached in other ways.

Attaching transmitters to birds also presents special problems. Anything that affects their streamlined shape, center of gravity, or wing movements may hinder flight, and hence their survival. Similarly, transmitter packages must not interfere with incubation or the eggs of nesting females. For these reasons, most early wildlife radio telemetry studies dealt with mammals. However, several successful methods for attaching transmitter packages to birds have been developed, including harnesses, adhesives, and attachment to the leg, tail feathers, or neck.

What does the signal reveal about the animal?

Whether an animal is active or not can be detected by variations in the signal of nearly any transmitter package. Long, flexible whip antennas, however, enable researchers to determine actual activities, especially if the whip antenna is part of a transmitter package that uses a harness encircling the body. Some of the specific activities that have been correlated with signal changes (through visual observation while listening to the signal) include: resting, walking, running, feeding, certain vocalizations, and flying. Specialized or unusual behavior—such as convulsions of birds dosed with pesticides, or drumming of male ruffed grouse—have also been identified. Periodic monitoring of signals for a short time during both day and night provides information on daily activity patterns and the proportion of time spent in each activity.

What wild animals in Montana have been studied with telemetry?

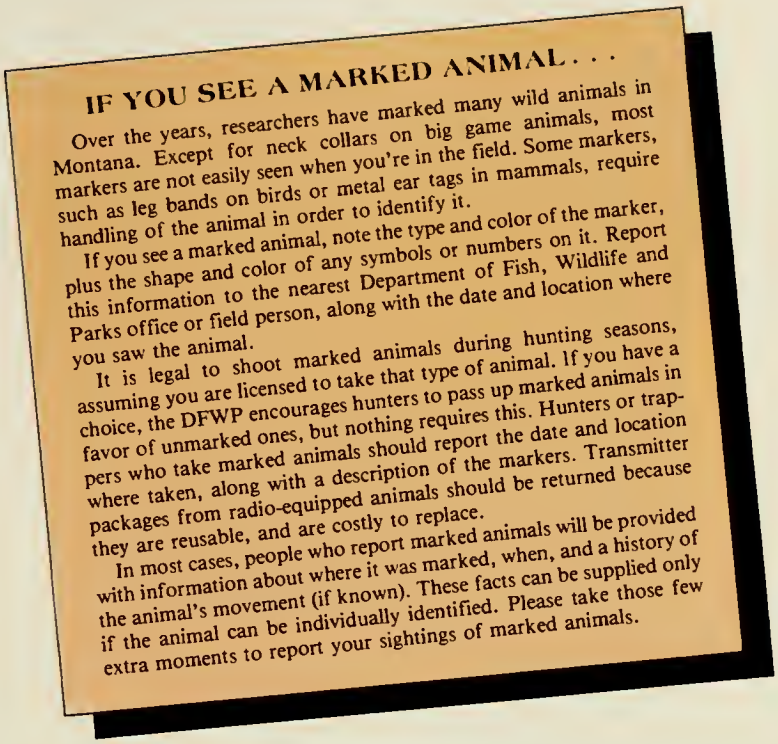
Montana animals on which radiotelemetry has been employed include all common big game species, most common upland game birds, several furbearers and predators, and a few other species such as paddlefish and eagles.

Some of the earliest uses of wildlife radio telemetry in Montana focused on specific land use or management practices and their effects on animals and/or their habitat. Other, more general, studies were designed simply to gain more knowledge about little understood species, or certain aspects of a species' life history.

Radio telemetry aided studies of the impacts of sagebrush removal on sage grouse and antelope. These studies further emphasized the great importance of this plant to these species.

Radio telemetry has been used to evaluate the impacts of logging, roads and/or road closures, and cattle grazing on elk movement and behavior, especially as they affect hunter opportunity in a given area.

Survival of newborn deer and elk has been studied using specially designed transmitters which change pulse rate when they are motionless for three to four hours. By frequently monitoring the signals, the investigator can immediately home in on any animal whose signal changes. This allows the animal to be retrieved so that the cause of death can be determined before decomposition or scavengers destroy the carcass. This also provides information on the extent, timing, and cause of mortality. Being able to determine these factors is invaluable where parasites, disease, predators, or other factors are suspected of causing unusually high mortality among newborns. To obtain the necessary amount of data by other means would be a logistical nightmare, as well as too expensive.



IF YOU SEE A MARKED ANIMAL . . .

Over the years, researchers have marked many wild animals in Montana. Except for neck collars on big game animals, most markers are not easily seen when you're in the field. Some markers, such as leg bands on birds or metal ear tags in mammals, require handling of the animal in order to identify it.

If you see a marked animal, note the type and color of the marker, plus the shape and color of any symbols or numbers on it. Report this information to the nearest Department of Fish, Wildlife and Parks office or field person, along with the date and location where you saw the animal.

It is legal to shoot marked animals during hunting seasons, assuming you are licensed to take that type of animal. If you have a choice, the DFWP encourages hunters to pass up marked animals in favor of unmarked ones, but nothing requires this. Hunters or trappers who take marked animals should report the date and location where taken, along with a description of the markers. Transmitter packages from radio-equipped animals should be returned because they are reusable, and are costly to replace.

In most cases, people who report marked animals will be provided with information about where it was marked, when, and a history of the animal's movement (if known). These facts can be supplied only if the animal can be individually identified. Please take those few extra moments to report your sightings of marked animals.

Attaching transmitters to birds presents special problems, since anything that affects their center of gravity or wing movements may hinder flight.

Is telemetry used to help gather other information?

Investigators also use radio telemetry to improve big game census techniques. Just like trying to count every single human, it is also impossible to count each individual in a wildlife population. Wildlife managers often use aerial surveys to determine big game populations. We know more animals are observed under certain conditions, such as complete snow cover and bright sun, and assume that we observe a higher percentage in open habitats. We also know we miss some animals in any type of habitat. In the past, the big question has been what percentage of the animals present in an area are actually seen, and is this percentage fairly constant for a given habitat type and set of counting conditions? By marking a sample of a big game population with visually identifiable radio collars, we are beginning to have some better answers to these questions.

Biologists conduct regular aerial surveys of the area, noting all radio-marked animals. They then immediately fly the area again, using a receiver to determine how many radio-marked animals were actually in the survey area. By repeating these flights several times, biologists can estimate, under different conditions and in various habitats, the percentage of animals present but not seen. If an adequate sample of animals has been marked, the proportion of marked animals seen can be used to reliably estimate the total population. This information is important when it comes time to make harvest recommendations.

Before radio telemetry was available, management decisions concerning big game harvest conservatively assumed that we saw all animals during a survey, even though we knew this was not true. This meant harvest quotas were often conservative, which, at least in some instances, allowed certain populations to increase to undesirably high levels. The end result often was game damage to agricultural crops, or unnecessarily high big game mortality, especially in severe winters. Avoiding either of these situations, if at all possible, is the most desirable course of action. Although improved census techniques and harvest strategies will never totally solve these problems, they should go a long way toward helping alleviate them.

Data from the above mentioned (and other) studies utilizing radio telemetry have also been used to assist land managers in formulating forest, farm, and rangeland management guidelines or recommendations. Some of these deal with practices which might cause direct animal mortality, such as use of certain pesticides. Most, however, deal with habitat alterations such as logging, sagebrush control, or sodbusting. These recommendations are designed to avoid, as much as possible, the negative impacts of such practices on wildlife dependent on those habitats.

Wildlife radio telemetry has clearly played an important part in gathering data on which to manage wildlife populations. We anticipate it will continue to do so well into the future. ■

Sept. 27, 1986

NATIONAL HUNTING & FISHING DAY

DAVE NEIL

"Rolling" Your Own for Fun and Profit

Discover Reloading

by Dennis Flath

Montanans are, in large part, a society of sportsmen. Hunting and shooting are important and popular sports—in fact, "popular" may be an extravagant understatement. But shooting just for target practice or plinking can be a bit expensive. For example, a box of .357 Magnum handgun ammunition runs from $12 to $15 over the counter of most stores—that's for 50 rounds that seem to disappear like popcorn when the sights settle on a 5-inch bullseye or a bouncing tin can. Serious practice with a big game rifle is also a financial burden with factory ammunition. But there is a solution. Enter reloading: the natural parallel hobby for those who love to shoot.

Reloading fired cartridge cases for sporting firearms has been around almost as long as metallic ammunition. Metallic cartridges used during the Civil War and by the post-war Army up until 1882 could not be reloaded. However, extensive experimenting with reloadable self-contained ammunition was begun as early as 1860. By 1871 reloadable cartridges and the tools to do the job were available to the sporting public. During the 1870s and 1880s, reloadable cartridges blossomed forth in an almost dizzying array of variations. Reloading was "in," and some companies didn't even bother to manufacture and sell loaded ammunition. They just sold empty brass and loading tools. Consequently, reloading has been a passion with American shooters for over a century.

One of the biggest advantages of reloading is the cash savings; the appeal of being able to shoot a .357 or .45 for the price of a .22 should be obvious. The most expensive component in a cartridge is the case; luckily, this is the one component that can be used over and over again. For plinking or casual target practice, additional savings can be realized by using home-cast bullets.

But there's another advantage to reloading that in some ways even transcends the cash savings. This is the accuracy that can be attained by tailoring a load to the unique idiosyncrasies of a particular gun. The reloader serves not only as his own production line, but as his own quality control staff as well. By being very careful and taking the time to do the job right, the hobby reloader can turn out ammunition of pre-eminent quality. That quality

translates into accuracy and reliability on the range and in the field.

Handloading, of course, requires a commitment of time and space. A well-lighted and properly organized work area is essential. All components must be properly labeled and stored to prevent accidental mixing or confusion. Powder and primers should be stored in a cool, dry area. The reloading press must be firmly bolted to a sturdy workbench, and sufficient room is needed for other equipment such as a powder scale, powder measure, and case trimmer. A couple of late-edition reloading manuals are indispensable. Not only do they contain the necessary reloading data, but most of them also describe the entire reloading process in detail. All major bullet manufacturers publish manuals, and the beginner should read at least one of them from

Reloaded ammo can be tested for accuracy by firing several three- or five-shot groups and measuring from center to center of the widest shots.

cover to cover.

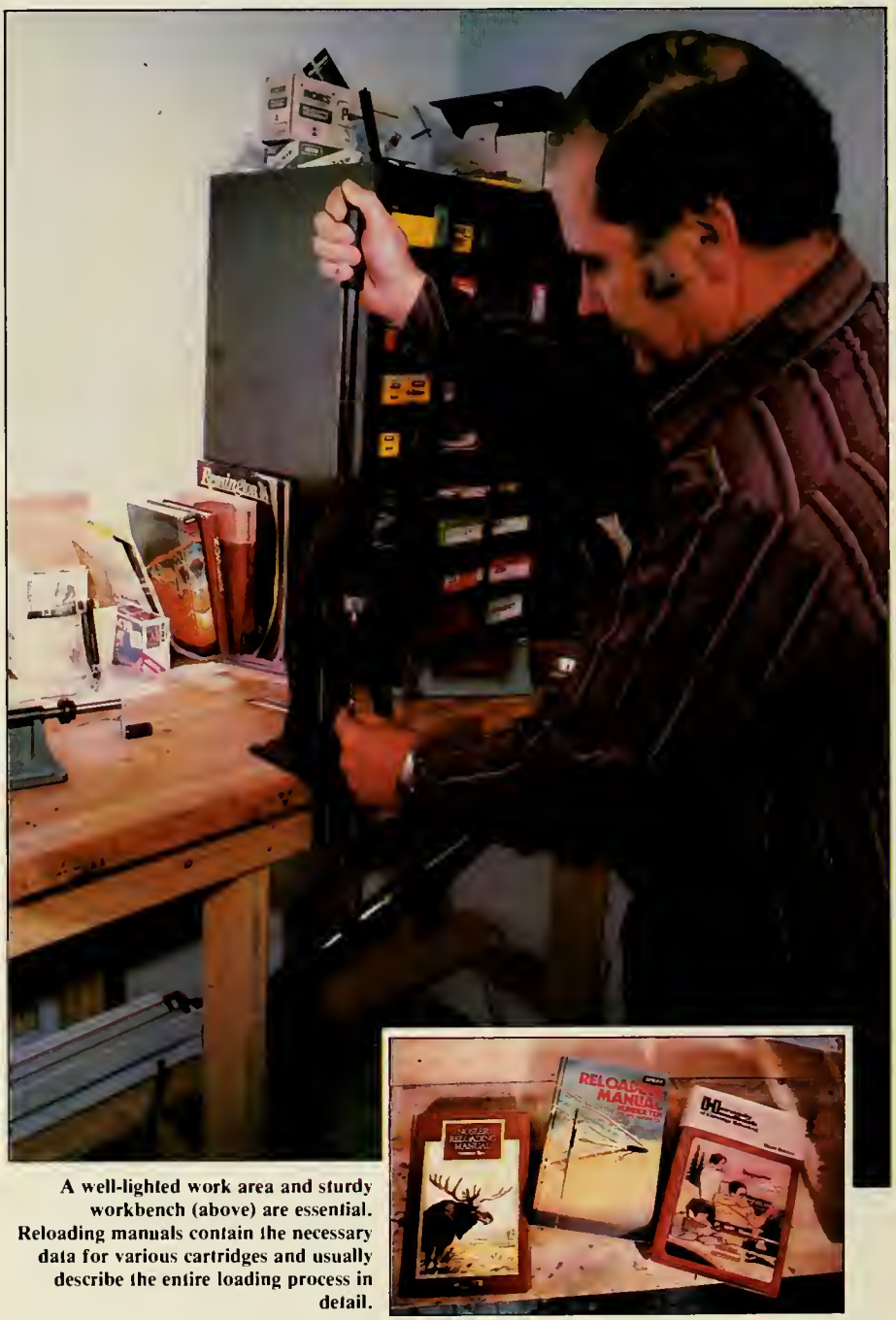
Six basic steps in reloading a fired cartridge case are described here. Additional details are provided in published reloading manuals.

Step 1: Clean and lubricate the empty case. Cases need not be shiny bright, but should be free of any dirt, lint, or dust that could scratch the inside surface of the die. If powder residue builds up around the neck, remove it with very fine steel wool. Case lube—a lubricant used to reduce friction when resizing cartridge cases—can best be applied by rolling the case on a saturated pad. Apply lube sparingly, as too much will cause "lube dents" to appear during resizing. Straight or tapered cases can be lubed along their entire length, but bottlenecked cases should only be lubed on the body, with the neck left dry. Also, the inside of the neck should be lubed on all calibers for which the resizing die includes an integral expanding plug (the part of the die that expands the sized neck of a cartridge case to the diameter needed to hold the bullet firmly).

Step 2: Resize and decap (knock the fired primer out of) the lubricated case. A cartridge case expands when fired, and must be reduced in dimension to its original size. This is done by the resizing die, which includes a decapping pin that pops out the spent primer.

Step 3: Trim and chamfer (bevel) the case mouth. A cartridge case will stretch a little with each firing, and should be checked at each reloading to ensure it does not exceed the maximum

DAVE BOOKS



A well-lighted work area and sturdy workbench (above) are essential. Reloading manuals contain the necessary data for various cartridges and usually describe the entire loading process in detail.

case length for that caliber. A case-length gauge, such as the McKillen and Heyer, or a caliper, can be used to check length. Cases that are too long must be trimmed with a trim die and file or a rotary case trimmer. New cases or newly trimmed cases must have the inside and outside of the case mouth beveled slightly. This is accomplished with a light turn of a deburring tool. At this stage, all case lube should be wiped off the resized case, and the primer pocket should be cleaned if necessary.

Step 4: Seat the new primer. Follow the advice of a reloading manual in selecting a primer of the correct hardness and flash intensity for the type of cartridge and powder used. Pistol and rifle primers should not be interchanged. Magnum primers have a higher (hotter) flash intensity than standard primers to more reliably ignite slow-burning powders in large-capacity cases. Primers must be fully seated in the primer pocket; proper seating can be checked with a straightedge. This is especially critical in any handgun load or in any ammunition used in an autoloading gun.

Step 5: Charge the empty case with powder. Modern smokeless powders are available in a wide variety of burning rates. The amount of powder used for a particular cartridge depends to a large degree on the burning rate. The powder selected should be one which nearly fills the empty case when the recommended charge is used. The powder charge also varies with bullet weight; in many calibers, the reloader may wish to switch powders when switching bullet weights in order to achieve optimum performance.

Step 6: Seat the bullet in the primed and charged case. Seating depth should be such that the overall cartridge length meets published standards. For optimum accuracy, the seated bullet should be just short of touching the rifling when the cartridge is inserted in the rifle's chamber. With a bolt action rifle, proper cartridge length can be determined by the following procedure. With the rifle unloaded, uncocked, and the bolt closed, insert a cleaning rod down the muzzle until it rests on the bolt face. Mark the cleaning rod at the muzzle. Next, remove the bolt and place a bullet in the throat of the chamber so it is just touching the rifling and hold it in place with a pencil or short section of cleaning rod. Once again, insert a cleaning rod down the muzzle until it contacts the bullet tip, and make a second mark. The difference between the two marks, less a few thousandths of an inch, is the correct maximum cartridge length for that particular rifle.

Cartridge length is restricted in many guns due to magazine length or action design. For example, the Model 94 Winchester's action will not handle a cartridge longer than 2.55 inches, regardless of optimum seating depth. The same limitation applies to magazine length in many older bolt action rifles chambered for the .257 Roberts cartridge. A number of other examples exist as well.

A multitude of precautions apply to the reloading game. Most are common sense, but still worth repeating:

- Discard cases that show signs of cracking, case separation, or a loose primer pocket.
- Keep primers clean. A small amount of case lube in the primer can result in a misfire.
- Develop a reloading sequence that will prevent any possibility of double-charging a case. This is particularly important when loading handgun ammunition.
- Don't smoke when open containers of powder are in the vicinity.

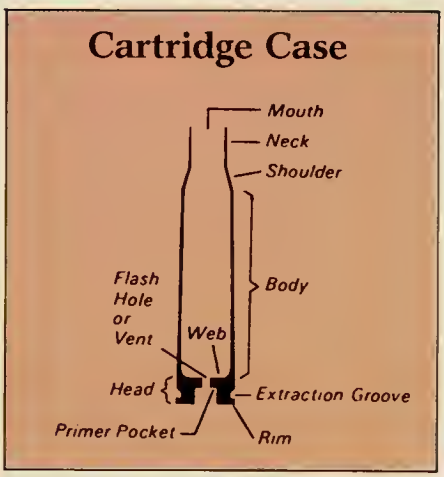
Most reloading efforts are aimed at bottlenecked cartridges for use in bolt action rifles. As long as case length falls somewhere below maximum, it's okay. These are seldom crimped because the bullet can be held in place simply by case neck tension. However, some cartridges do require a very exact case length, a crimp, or both. For example, cases such as the .45 A.C.P. and .30 M1 Carbine must have exactly the correct length and no crimp or only a very light taper crimp. Cartridges that require a crimp, such as the .30-30 or .32 Special, must have a uniform length to produce a consistent crimp.

If cast bullets are being used, it will be necessary to "bell" the case mouth slightly to properly start the bullet into the case without shaving lead. For most pistol calibers and straight-walled rifle cases, three dies are required rather than two. The extra die performs the function of expanding the mouth of the resized case as well as belling the mouth to the desired degree.

American ammunition is designed for use with Boxer primers. These have

Too much case lube can cause dents to appear on the cartridge case; this will eventually result in hardening of the brass.

A blown primer (left) or ruptured case (right) are indications of excessive overloads—such loads are dangerous and must be avoided.



a single, centrally located flash hole, which allows the decapping pin to eject the spent primer. However, most European ammunition is loaded with Berdan primers. These have two or three flash holes located radially from the center of the primer pocket. Berdan-primed cases are difficult to reload and are best left alone by the hobby reloader.

Once you've committed the fundamentals of reloading to memory, it's time to start making the system work for you. When working up a load, start with the lowest powder charge listed in a manual and gradually work up until you've achieved optimum accuracy or until pressure signs indicate you should stop. If starting load data are not listed, reduce the recommended maximum charge by 10% and work up gradually. For powder charges over 40 grains, charges can be increased by 1-grain increments. Charges from 20 to 40 grains should be increased by 0.5 grain increments, except when near the minimum, where 1-grain increments are acceptable. Smaller charges (less than 20 grains), such as those for most handgun loads, should only be increased by increments of 0.1 or 0.2 grains at a time. A good rule of thumb is to increase powder charges in roughly 2% increments.

Watch for pressure signs such as split necks (also a sign of old or fatigued brass), unusually difficult resizing, excessively flattened primers, gas leakage around primers, loose primer pockets, or difficult case extraction. Any of these is an indication that permissible pressure levels have been exceeded. Since pressures will vary with component brands, it's important not to mix components. The key to consistent accuracy is being able to control all the variables, and component brand is an obvious variable the reloader can control.

In testing reloaded ammo, the ultimate goal is accuracy. Fire several groups of each load from a sturdy bench rest and record all group sizes for later analysis. Shoot three- or five-shot groups, and measure from center to center of the widest shots.

Maintain a written record of the performance of all loads, along with a description of the conditions they were fired under. Wind speed and direction and temperature are important things to note since they will often influence group size or point of impact. The resulting set of data will provide an enlightening profile of the performance of a particular firearm.

Working up a highly accurate load for a particular gun will provide the shooter with a better appreciation of what happens when the hammer falls. It also enhances marksmanship and familiarity with the firearm, important elements for success in the field. And, it may even lead to new interests and activities, such as competitive silhouette or target shooting. The shooting and reloading literature is abundant, and it will pay new reloaders to read as much as possible on the subject.

With bullets cast from old wheel weights or scrap lead, it really is possible to shoot a .45 for about the same cost as a .22 rimfire. Of course, there is the up-front cost of equipment, but this is quickly recouped with the savings from a relatively few boxes of ammo.

As attractive as those savings are, most reloaders don't really pocket their savings. They just get to shoot a lot more than their non-reloading neighbors! ■

RELOADING EQUIPMENT AND SUPPLIES

Essential Equipment:	Cost
Reloading press	$ 40-100
Die set and shell holder	20- 28
Case length gauge	7- 10
Case trimmer	36- 50
Powder scale	25- 60
Deburring tool	2- 10
Case lube pad	3- 7
Reloading handbook	8- 25
Powder funnel	3- 7
Subtotal	$144-297

Optional Equipment:	Cost
Powder measure	$ 25- 50
Powder trickler	5- 8
Vernier caliper	10- 60
Loading blocks	3- 10
Case tumbler	40-120
Subtotal	$ 83-248
Grand Total	**$227-545**

The intellectually perceptive reloader will gradually expand the "essential" list at the expense of the "optional" list as the year progresses. Ideally, everything should be essential by the time there are only five more shopping days left before Christmas. This is good strategy if it doesn't backfire.

Cases should be checked at each reloading to make sure they do not exceed maximum length for the caliber. They can be measured with a case-length gauge (above) or a caliper (below).

READERS RESPOND

A Dynamite Experience

I just finished reading "Out of the Darkness" by Patrick Graham in your July/August issue. It brought back some interesting memories.

Actually, 1975 wasn't the first time department biologists tried to catch sturgeon below Kootenai Falls. In 1957 or '58, Jim Posewitz and I tried to collect a sturgeon for Dr. C.J.D. Brown who was working on his book, "Fishes of Montana." Despite rumors of sturgeon below the falls, he didn't have an actual specimen. I was the assistant district fisheries biologist in Kalispell then, and Jim came through looking for help. We bought a case of dynamite and headed for Libby. We thought some "DuPont Spinners" in that deep water might bring up a sturgeon. We'd used this technique successfully in the Swan River to sample fish in water too deep to shock.

Our first try was where the Yaak River joined the Kootenai. A "three-sticker" produced a 30-foot water spout, just as the Great Northern went by across the river, but no fish. I've always wondered what anyone on the train who saw the spout thought.

The next day, we picked up department game warden Chet Anderson and a local sportsman in Libby, and boated into the canyon below the falls. Jim and I threw the "bombs" from one of the large rock islands, while Chet and the sportsman waited behind the island in the boat until the shot went off. Then they motored downstream of the shot to net anything that came up.

We were very naive. We started with "three-stickers" and couldn't even see the explosion. We worked up to a "nine-sticker," and then brought up only bubbles, even though our island shook noticeably. Did we get any sturgeon? No. Only a couple of ling and squawfish, and some memorable experiences.—*Bert Cushing; Richland, Wash.*

Harper, Cotterell Hold the Title

In my Nov./Dec. 1985 article, "Birding—the Sky's the Limit," I reported that Doug Bonham et al. held the current record for the Montana "Big Day" bird count. I just learned that this record was broken on June 28, 1984, by W. Edward Harper of Sacramento, Calif., and Sharon Cotterell of Bozeman. On that day, Harper and Cotterell traveled along a route from Reedpoint to Big Lake to Livingston to Bozeman to Three Forks to Ennis Lake. They recorded 154 species, beating the previous record by three species. Among the species logged during this "Big Day" was Montana's seventh Blackburnian warbler.

Harper and Cotterell worked long and hard to establish this record, and I'm truly sorry I wasn't aware of it when I wrote the article last year. They scouted all parts of Montana before settling on the final route, and it required years of experience along that route to know exactly where to look for key bird species. In addition, the observers required a very practiced ear to discern song, and a tremendous amount of general birding knowledge. I hope publication of this note will give these birders the acknowledgment they're due.—*Larry S. Thompson; Helena, Mont.*

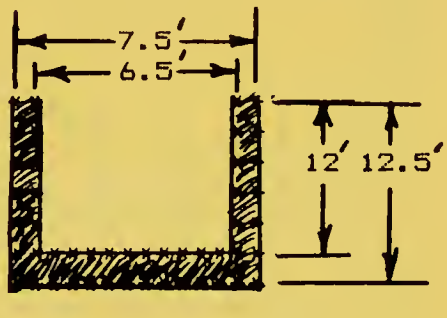
The Less-Than-Two-Ton Nest

My wife and I certainly enjoy your magazine. Although we live in Springfield, Neb., and are originally from Texas, we fell in love with Montana during our first visit back in the early '70s and have since bought a summer place on the West Fork of the Bitterroot.

Being from Texas, "The Two-Ton Nest" in the "Readers Respond" section of the July/August magazine caught my eye. Since I am an environmental engineer, I felt I had to respond. If I have interpreted Mr. Flath's and Mr. Hazlewood's calculations correctly, I believe an error was made in the basic approach to the problem.

- The volume calculated and hence the weight of ponderosa pine was that which could be placed inside a nest of 298.5 cubic feet, not the weight of the nest itself.
- Using a cylinder as a model for the nest—there are actually two cylinders to be considered, one with the internal dimensions stated in the article and one with external dimensions depending on the wall thickness of the nest. The actual nest materials make up the walls and bottom only. Therefore, the difference between the larger external cylinder volume and the smaller internal cylinder volume would be the approximate volume of the nest materials.
- Assuming the nest was made of two layers of three-inch diameter limbs, the thickness of the nest walls/floor would be approximately six inches, and the volume could be calculated as follows:

V internal = (397.995 cu. ft.) (0.75 for shape correction) = 298.5 cu. ft.
V external = (3.142) $(D)^2$ (H)/4x0.75
where: D = 6.5 ft. + 1 ft. = 7.5 ft.
H = 12 ft. + 0.5 ft. = 12.5 ft.
V external = (3.142) $(7.5)^2(12.5)$/ 4 x 0.75 = 414.23 cu. ft.
V nest = V external-V internal = 414.23 cu. ft.-298.5 cu. ft. = 115.73 cu. ft.
Weight of nest = (1,904 lbs./128 cu. ft.) (115.73 cu. ft.) = 1,721.5 lbs.



(not to scale)

It may not be two tons, but it's still pretty heavy.—*Ron Burnett; Springfield, Neb.*

We've All Lost Respect

Both "Operation Trophy Kill" (July/August 1986) and "Montana Sting" (May/June 1984) were excellent articles, emphasizing the problem we *all* have, not just those fortunate enough to live in Montana.

The only problem I saw in the article was the last paragraph: "Montana's wildlife belongs to Montanans; poachers are simply thieves who steal from each of us. Help us fight back." The last part of the quote is true, but I feel the first part contains a bit of misinformation.

I feel that the animals and the land (federal) should belong to *all* Americans. Therefore, we should *all* be urged to continue to fight against *all* poachers throughout the United States, in hope that someday hunting and fishing will again regain much of the respect we have *all* lost.—*Frank Jaworski; Stockton, Calif.*

All year long,
Say "Thanks" to the Landowner
Who lets you on.

Sign him up for
MONTANA OUTDOORS.

Re-Creating with the "Right Stuff"

by Gerry Schroeder

Every year, far too many hunters unknowingly ruin or damage the cape or hide of a trophy animal they intend to have mounted. An experienced taxidermist can usually restore a damaged cape so stitches don't show, but this is not true in all cases. With certain tears or cuts, the repair will show. A ruined or damaged hide is a sad state of affairs for the sportsman who could have avoided problems by applying a few basic "field care" principles.

Once it is down in the field, how should you properly care for an animal you intend to have mounted? Pay particular attention to three items: (1) heat, (2) blood, and (3) damaged hair. If not controlled or minimized, these three can individually or collectively destroy a trophy skin. Once the trophy is on the ground, the hunter needs to do "all the right stuff," or it could cost him a lot of extra money to repair or replace a damaged cape.

Heat—The Worst Offender

Heat is by far the worst culprit. It causes the hair to fall out or "slip," thus ruining the hide. You can pull large handfuls of hair from the hide, and soon nothing is left but the bare skin. Once this starts to happen, you probably cannot salvage the hide. Heat also causes a rapid increase in bacterial and enzyme action, the forerunners of the decaying process.

To complicate matters, you have to contend with two sources of heat: from the air temperature, and from the animal's carcass. The weather or air temperature determines how long it takes for a skin to sour and then "slip." Remember that heat rapidly increases the hide's deterioration. On the other hand, cold temperatures slow the process; freezing actually stops the decomposition, as long as the hide remains frozen. Once it is unfrozen, the deterioration process resumes. Hunters in Montana know how high daytime temperatures can rise in early fall. This makes immediate and ongoing attention to the cape of a trophy critical.

Likewise, the hunter must be concerned with the body heat from the carcass. Isn't it a marvel how wild animals survive 20-below-zero temperatures day after day? This is partly due to the insulating properties of their hair, which helps sustain their body temperature. Once an animal has been taken, that insulating hair continues to trap body heat for hours, causing the animal's hair to "slip" during even the coldest months.

To avoid the calamities of heat, skin the trophy immediately; this is especially important when taking an animal on one of those Indian summer days. Even in late fall, you are flirting with disaster if you do not remove the hide as soon as possible after the kill. If you elect to risk leaving the skinning chores until another time, at least remove the animal's innards. Then roll the animal onto cut boughs or sticks to allow air to circulate underneath the carcass.

Once you have caped the trophy and transported it from field to vehicle, keep the skin as cool as possible. Don't roll the hide up and place it in a plastic bag. Rather, lay it flat, hair side down, so air can circulate around it. When you get home, immediately take the cape to the taxidermist. If you can't, then hang it in a shady, cool spot and take it to the taxidermist as soon as you can.

Another option is to place the trophy in a plastic bag and put it in a freezer. Of course, the average elk trophy cape simply won't fit in the average freezer, so this may not be an alternative for many hunters. But if you can put the trophy cape in the freezer, decomposition stops, and the hide can remain there safely for several months. If you are going to leave the trophy in a freezer for longer than a month, wrap the animal's head in a wet towel. This prevents dehydration of the eyes, ears, nose, and lips.

Blood—Permanently Discolors

The second problem the trophy hunter has to contend with is blood. The hemoglobin contains iron; when a skin is tanned, the bloodstain permanently changes to a yellowish, rusty color. This is a real problem with Dall sheep, goat, and antelope hides. Bloodstains are noticeable in all but the very darkest colored animals. Remove blood with water, as quickly as possible. Do not submerge the hide or let it soak. Simply use enough water on the affected hair to get the blood out. The longer you wait, the harder it is to remove. Better yet, do everything possible to keep blood from getting on the cape during the field dressing, skinning, and transporting process.

Two other hints might help you cope with the problem of blood: (1) It is often better to skin or cape an animal before field dressing it. (2) When an animal is shot in the lungs, it will frequently bleed from the nose; cotton wads placed into the nostrils will help prevent blood from staining the muzzle.

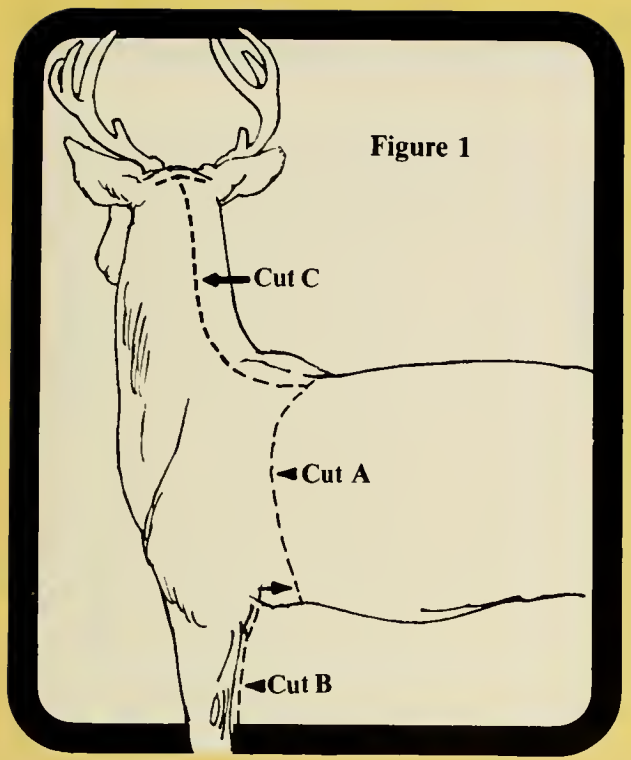
Bloodstains on a trophy animal can be critical, and it takes some effort on the part of the hunter to eliminate or minimize the problem.

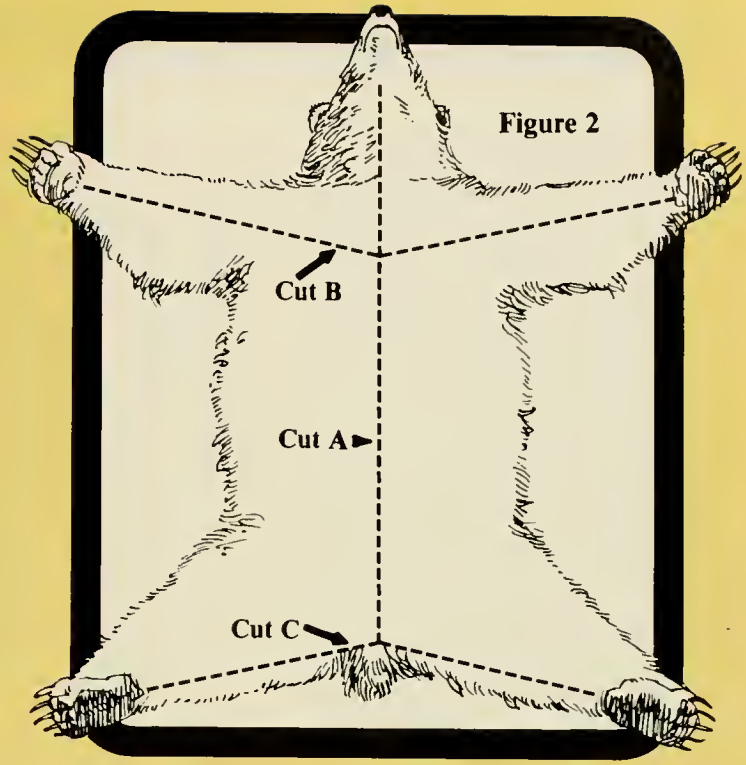
Damaged Hair—A Common Mistake

Whenever the hair on an animal's hide is drastically cut or broken, the taxidermist will have to repair the damaged area. Usually, repair is possible, but sometimes it is not. Take extreme care when shooting, skinning, and transporting animals you plan to mount. First, place your shot carefully; a well-placed shot to the heart or lungs is efficient. If the shot is to the head or neck area, the taxidermist may not be able to repair the entry and/or exit hole of the bullet or arrow.

Another common mistake is "bleeding out" an animal you intend to mount by cutting its throat. This ruins the cape on short-haired animals, and usually necessitates unsightly repairs on long-haired animals. If the trophy is dead, the heart has stopped pumping, and cutting the throat serves no purpose. With a shot through the lungs, the animal will internally "bleed out." For many hunters, another reason for cutting the throat is to aid in removal of the esophagus; simply remove the esophagus after the animal has been skinned.

You can also damage hair when you drag a trophy to your vehicle. If there is no snow on the ground and you drag your





trophy very far, the hair will be damaged. Even dragging a carcass on snow can break the hair; when the animal is pulled over downfalls and other rough objects, cuts and damage are certain to result. The best solution is to skin out the trophy and pack out the hide. If you have to drag it, drag it on a tarp or even a jacket to give the hide some protection.

Another way hides are damaged is by rope burns. Keep ropes off the head and neck, and never drag a carcass by a rope around its neck.

Caping—Careful Cuts

Two ways exist to cape a trophy for a shoulder mount. The first is to entirely remove the cape from the front shoulder, neck, and head. This is best, because it completely removes the skin from the animal, thereby reducing the body heat from the head area; however, unless you are familiar with this technique, don't try it. (Since this procedure is fairly intricate, it will not be discussed in this article.)

The second method is relatively easy and can be performed by the inexperienced. You need to make four separate cuts (see Figure I). Cut A is a circular cut made completely around the animal's body. Start it six inches behind the front legs so that you take a sufficient amount of cape (it is better to have too much hide than too little). Also, before starting this cut, make sure both front legs are perpendicular to the body. If you don't do this and one or both legs are forward, you will probably not take enough brisket hide when the cut is made.

Next, dejoint the front legs at the knee. Then make Cut B from the back of the dejointed knee, up the back of the leg to the leg pit (think of it as the animal's armpit); then make a cut straight back to circular Cut A. Do Cut B for both legs.

Cut C is a continuous cut up the back of the shoulder and neck area to a spot where the head joins the neck. After making these cuts, skin the hide forward over the head. At this point, the head and cape should be cut off from the neck.

When caping or skinning a potential mount, always pull the hide away from the flesh and cut toward the meat and not toward the hide. If you cut toward the hide, you will end up cutting holes in the skin.

Skinning—For Rugs and Life-Sized Mounts

You can use several methods of skinning for rugs or life-sized mounts; however, only the most common one will be discussed in this article. Figure 2 indicates the three separate cuts you need to make. First, roll the animal onto its back and stake the legs apart. This makes the initial cuts easier. Make Cut A from the tip of the tail to the center of the throat. Once you reach the throat, stop; do not continue cutting through the lower jaw skin and bottom lip.

Make Cut B from a point directly behind the large pad on the front foot, along the very back of the front leg, across the chest, and then along the back of the other front leg to its pad. Dejoint feet from the legs at the wrist.

Make Cut C in the same way as Cut B, except along the hind legs.

After these three cuts are made, skin the trophy from the hind legs toward the head. When you reach the head, dejoint the head and hide from the carcass. Leave the complete skinning of the head and feet to the taxidermist or to an experienced skinner.

Even when you take every precaution, you will sometimes lose a cape or hide because of circumstances beyond your control. If this happens, you can often obtain a replacement cape from a taxidermist; some capes (such as bighorn sheep) can be very expensive. But when the trophy hunter is aware of the problems of heat, blood, and damaged hair, he should be able to deliver a hide in excellent condition to the taxidermist.

Taxidermy is an art; if the taxidermist is to re-create the natural beauty found in wildlife, he needs first to receive a cape or hide that has received proper field care. ■

NONGAME NEWS

A CHANGE OF SEASONS

Many of us like to go afield in September—whether it's to scout areas for hunting trips later in the fall, gather wood, enjoy the foliage, or merely to breathe the crisp air that the change in season brings. For many birds, it's a time of transition. By midmonth, migration is well under way. The gathering and passing flocks add to the enjoyment of all outdoor experiences during this season.

For many migratory birds in North America, fall migration represents a return from a three- to four-month stay in the breeding areas, to Central and South America where they stay for the remainder of the year. In this respect, "our" breeding birds are actually foreign visitors we host only briefly. In the case of some Montana breeding birds, the distance to wintering grounds is extraordinary: Both bobolinks and barn swallows migrate as far as 5,000 to 7,000 miles to wintering areas in southern Brazil and northern Argentina. Whether such long distance migrations evolved as a means for Southern Hemisphere species to cope with winter by gradually shifting to the moderate northern summer, or vice versa, is unknown. Most theories involve shifting climates corresponding to glacial advances, which favored the species that adapted by shifting their distribution.

In most species, the onset of migration is brought about by physiological changes triggered by decreasing day length. Hormones released by the pituitary and adrenal glands cause the accumulation of body fat needed by birds to sustain them for long migratory flights. Many species almost double their body weight immediately before migration. Research shows that these same hormones cause increased restlessness, and that cold weather during the time when birds are in this altered state can actually trigger migration.

Orientation by the stars, sun, visual landmarks, and even the earth's magnetic field contributes to the consistency which birds show in their selection of migration routes, and to their ability to return to the same nesting and wintering areas year after year. Most species apparently use a combination of these techniques.

A classic experiment in Europe showed that adult starlings captured during fall migration and released south of their usual wintering area were able to adjust, flying north to arrive in the usual area. Immature birds released in the same area did not adjust, and continued south beyond the usual wintering area, returning to a new wintering area in subsequent years. This experiment suggested there was an instinct

Brown Creeper
JAN BONHAM METZMAKER

to head south, but that the ability to navigate to a specific area must be learned. The adults were apparently able to "read" the sun's position, adjust, and then use landmarks to zero in on their traditional wintering areas.

Migration is complex, but what it means to most people each spring and fall is the opportunity to enjoy diverse birds—whether they are geese flying in a "V" overhead or songbirds in our yards and wildlands. In Montana, some likely spots to view migrating birds include wildlife refuges, city parks, shrub thickets, and streamside areas, shelterbelts, stock ponds, or other areas with mixed vegetation, particularly near water. Contact your local Audubon group or Department of Fish, Wildlife and Parks office to find out about the areas nearest you, or set out to discover them for yourself.

FIELD TRIP UPDATES LATILONG 13

On the weekend of June 13-15, the Flathead Audubon Society sponsored a field trip to Thompson Falls, aimed at updating bird distribution for latilong block 13 in P.D. Skaar's "Montana Bird Distribution." Six observers visited a variety of habitats, searching for nests or recently fledged young of species not previously confirmed as breeders in the area.

Sixty-four species were observed; while none was new to the latilong, confirmed breeding was documented for common merganser, yellow warbler, song sparrow, and Brewer's blackbird. Cedar waxwings and northern rough-winged swallows were seen building nests, and should be added to the latilong list with some additional work to verify egg-laying. Results of this effort show that time spent in the field can be rewarding and informative, but firm evidence of breeding is still lacking for an additional 70 species suspected to breed in the Thompson Falls latilong.

Birders with additional updates from around the state for the 1986 breeding season are reminded to send them to the Nongame Program, Department of Fish, Wildlife and Parks, Research Park Bldg., Box 5, Montana State University; Bozeman, MT 59717.

DON'T FIGHT CAVITIES

It's woodcutting time again—time to remind wood gatherers of the unique natural resource that snags and the cavities they contain represent for a wide variety of Montana's wildlife. Most people know that cavity nesting is a way of life for woodpeckers, bluebirds, swallows, and wood ducks. Many additional species rely on cavities for nesting or shelter, including flammulated, northern pygmy, boreal, northern saw-whet, and western screech owls; western flycatcher; Say's phoebe; four species of chickadee; three nuthatch species; brown creeper; house wren; American kestrel; bufflehead; Barrow's and common goldeneye; hooded merganser; northern flying squirrel; raccoon; several species of bats; and the red squirrel.

Cavity-nesting birds generally differ from species using other nesting strategies. Since young are at less risk in an enclosed nest, there is less ecological pressure to bring the young to fledging quickly, so cavity nesters tend to have a longer nestling period. Thus, while most songbirds reach flight stage in eight to 14 days, some cavity nesters take twice that long. For the same reason, survival to fledging is often highest in cavity nesters, and clutch size is also large, since these species can afford to "put all their eggs in one basket," rather than adopt the approach used by other species, which re-nest once or more a season.

Most of the wildlife species which rely on cavities in Montana's forests prefer broken-topped snags greater then 12 inches in diameter at breast height. U.S. Forest Service offices have additional information describing the value of snags, snag management programs, and markers used to identify specific "wildlife trees" to protect them from being cut. Whenever possible, woodcutters should avoid downing large diameter, broken-topped trees with visible cavities. Such trees usually have rotted enough on the interior to be of limited value as firewood—but they are of high value to Montana's wildlife.

"Last in the Charts, But Not Least in Our Hearts"

by Wade Fredenberg
illustrated by Vern Craig

From the boldly bespeckled brilliance of a brook trout to the delicately dappled dorsal fin of a grayling, Montana has more than its share of beautiful fish. Every time I see a cutthroat, golden, rainbow, or bull trout decked out in spawning colors, I feel compelled to remark, "Now there is the prettiest fish in Montana!"

The debate over Montana's most beautiful fish will never be settled, nor should it be.

But not all fish are so gifted and glamorous. Beauty is in the eye of the beholder, and to this beholder some fish are not at all glamorous to behold. It occurs to me that with the proper criteria, I should be able to designate my personal choice as Montana's ugliest piscatorial resident. To be considered, a truly ugly fish must be a native. I know there are ugly imports, but for these purposes and at the risk of offending all you transplanted Montanans, only the 50-odd native fish species will be considered. Sorry carp fans, but my California friend is right: We native Montanans *do* have a distinctive look.

Now, the first fish that comes to mind is probably one of Montana's nine species of suckers. Everybody loves a sucker. We've all caught 'em and cussed 'em. It's true—they do have some ugly lips in that sucker family, and any definition of "ugly" should start with lips. Round, thick, fat, rubbery, blubbery, bulging lips are not pretty. But aside from that, suckers aren't all that bad. You can't always judge a fish by its cover, but suckers do have nice, smooth skin. Dressed up in spawning finery, the boldly striped longnose or iridescent green and red shorthead redhorse is a pretty sucker (pardon the pun). Lips are important, but for overall ugliness, suckers just don't make it.

Sticking with facial features, the next most striking anatomical attribute is the eyes. Bulging or beady, beady or bulging, a really ugly fish needs eyes either too large or too small for the rest of its body. Catfish, sturgeon, and burbot, they all have beady eyes. Little catfish are cute, but from birth onward their eyes never seem to grow. In addition, a scraggly set of whiskers bedecks the chin of each of these three contenders. Scraggly beards conjure images of the Ayatollah or Bhagwan, and beards help to enhance the overall ugliness of any living creature.

Catfish, sturgeon, and burbot are not bad choices as finalists. The lips, eyes, and beard are all present in disproportion. Furthermore, ugly things should not be found in pretty places, and these three seldom are. If catfish were found in Glacier Park, it could lead to the park's re-designation as a nuclear waste dump site.

The final clincher—all top three contenders lack real "name appeal." Names like rainbow and golden invite pleasant contemplation. "Burbot" sounds more like a noise emanating from someone's diaphragm after a big meal. A really deep thinker cleverly invented the much classier common name "ling" for this fish (not much of an improvement, in my opinion). If you've ever had this slimy, nocturnal, snakelike creature called a burbot wrapped around your arm in the lantern light of mid-February, you would surely cast your vote this way.

So, the winner is...none of the above. My Momma once told me during my ugly-duckling stage that beauty is only skin-deep, but ugly goes clear to the bone. Peel off the skin of a catfish, sturgeon, or burbot, and you're left with some of the most toothsome flesh in the fish world. Sorry, Charlie, only the non-edible species get to vie for the top ugly honors.

What's left? A quick check of my "Fishes of Montana" book shows...hmm, what's this? Last in the charts, but not least in our hearts. This could be the one. It's native, has fat lips and bulging, beady eyes, is widespread in western Montana and along the east slopes, too darn small to eat, and talk about name appeal. I've found it: The least glamorous fish in Montana is the sculpin. That's **S-C-U-L-P-I-N.** In any of its five varieties—mottled, torrent, shorthead, spoonhead, and especially slimy—the sculpin is a pretty offensive fish. A sculpin has fins that are huge for its body, and it has no neck (the neck being directly attached to the carcass) or as the book says, "Body stout anterior to anus then tapering sharply to tail...." It's a good thing they're small, because a four-foot slimy sculpin would be something to behold.

My mission is accomplished. As I lean back on my rock, prop up my rod, and watch my fishing line swing downstream, I can rest easy, knowing I've found the one fish that fills in all the blanks on the ugly form. Now, if I just had a sculpin for bait, I'll bet I could hook that big beautiful spawning brown trout working in that hole below me. It's a poorly kept secret that big trout love gulpin' sculpins. ■

The Non-Toxic Steel Solution

by Don Childress and William Phippen
illustrated by Mike Hollern

When waterfowl hunters in several areas of Montana take to their blinds this fall, they'll not only be taking shots AT ducks and geese, they'll be taking a shot FOR them as well. That's because these waterfowlers will be among the first in the state required to shoot shot shells loaded with...

THE NON-TOXIC STEEL SOLUTION

Earlier this year, the Montana Fish and Game Commission approved a proposal by the U.S. Fish and Wildlife Service (USFWS), a federal agency within the Department of the Interior, to require use of non-toxic steel shot in five Montana counties (Flathead, Lake, Sanders, Lewis and Clark, and Yellowstone) and two national wildlife refuges in Montana (Red Rock Lakes and Benton Lake) for all waterfowl and coot hunting in 1986.

The Commission's approval of the proposal reflects the members' conviction that requiring use of steel shot in these areas will prove an effective and responsible step toward reducing the vast numbers of ducks, geese, and other wildlife species that annually fall prey to waterfowl's "silent killer"—lead poisoning.

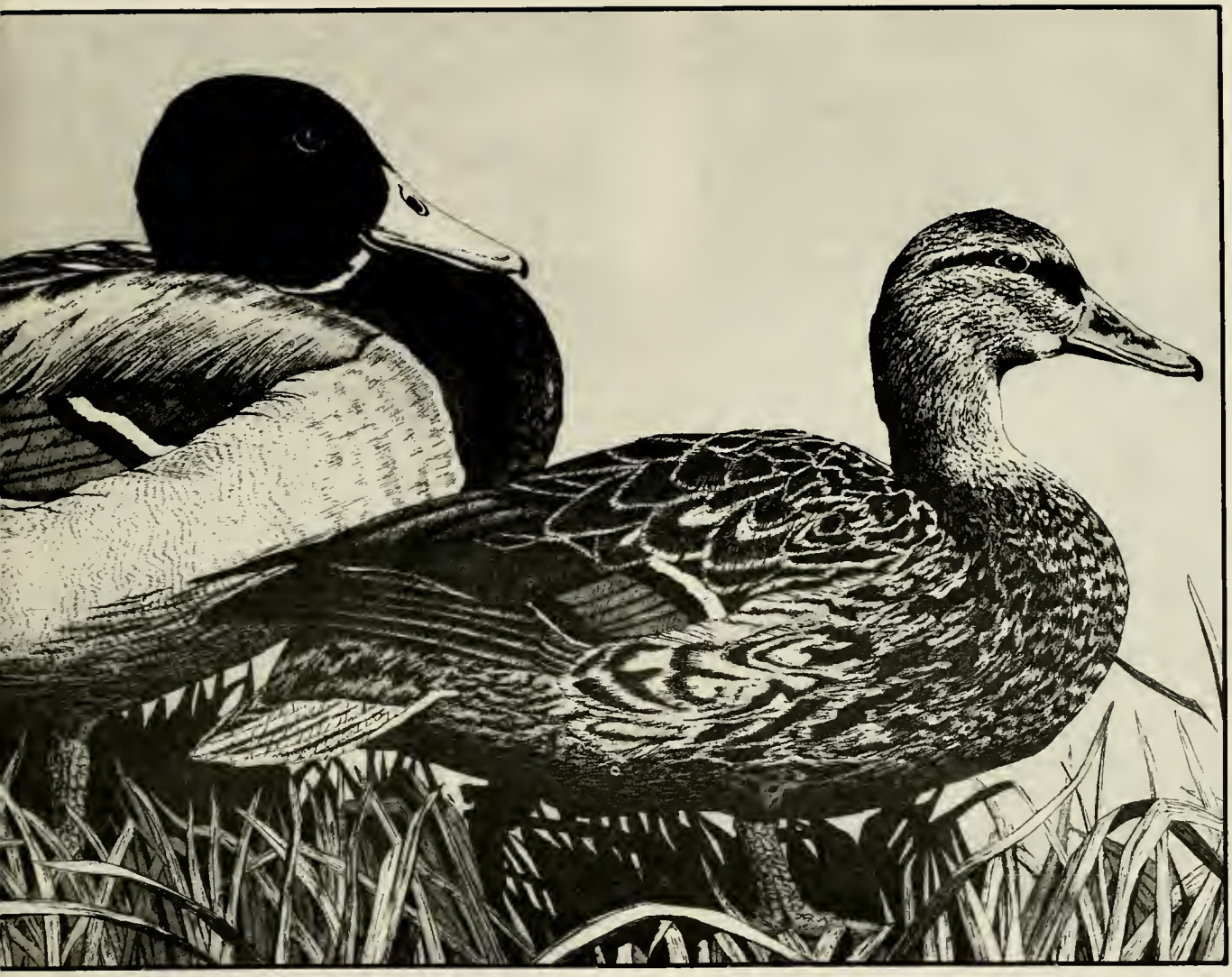
The Problem

Lead, one of the few elements not necessary for the growth and survival of plant or animal life, is highly toxic to most living things. Each year in this country alone, over a million tons of lead are used by industry in the manufacture of everything from gasoline and ammunition to batteries. This results in widespread exposure to lead by humans and wildlife. Such exposure can lead to a range of physiological effects involving production of red blood cells by bone marrow and the functioning of the central nervous system. When overexposure to lead occurs in wildlife, it quite often results in death.

The recognition that lead poisoning kills waterfowl is not new. In fact, the earliest reported losses directly attributed to lead poisoning came from two lakes in Texas in 1894. What *is* new, however, is growing acknowledgment and acceptance of the magnitude of the problem by hunters and others concerned with the welfare of waterfowl.

Each year, an estimated 1.5 million to 2 million of the nation's ducks, geese, and swans die from lead poisoning. This loss represents twice the number of waterfowl that begin their flights southward from Montana each fall. There may have been a time when we could ignore the large number of waterfowl succumbing to lead poisoning each year, but that time is past.

It's not news to those who hold wildlife, especially waterfowl, in high esteem that duck numbers have declined rapidly over the last several years. In 1985, the total duck population on Canada's most important breeding grounds was the lowest



recorded in the 30 years that breeding ground surveys have been conducted. The number of breeding mallards in the surveyed areas—which include those on which approximately 80% of the continent's mallards are hatched and raised—was 5½ million, again a record low. As recently as 1979, the surveyed breeding population of mallards was approximately 8½ million.

Faced with such disheartening statistics and the realization that duck populations are in serious trouble, waterfowl managers across the nation now recognize lead poisoning as one of the most serious problems facing waterfowl management in North America. In fact, only loss of waterfowl habitat has earned more concern.

How do waterfowl come in contact with this lead that is so lethal to them? Despite what many people might assume, lead poisoning does not result from the extended presence of lead pellets from hunters' guns left imbedded in waterfowl. Rather, lead poisoning is almost always directly attributable to lead shot ingestion. Waterfowl swallow this shot while feeding.

The lead pellets in most waterfowl loads are about the size of the seeds that many ducks and geese prefer as food, as well as the grit they consume to grind these seeds in the gizzard. Waterfowl pick up the shot as they feed on the bottom of waterways or shot-over fields. The problem is most serious in shallow, heavily hunted areas where dabbling ducks, such as the mallard, "tip up" to feed off the bottom. Shot deposited in deeper water also can be a threat to diving ducks, such as the canvasback.

An enormous amount of shot may be available in these areas. There are approximately 280 No. 6 lead pellets in each 12-gauge shotgun shell commonly used for duck hunting. Research indicates that hunters fire an average of six shots for each duck they harvest. At that rate, about one-half pound of lead is deposited in a marsh or on a field for each bird taken. That adds up to over 3,000 tons of lead being deposited into the nation's environment annually by America's waterfowlers.

The problem is placed in perspective when you consider that even one ingested lead pellet is enough to kill a duck. After lead pellets are ingested, they pass to the gizzard, where grinding and digestion of both food and pellets begins. The gastric juices involved in digestion include hydrochloric acid, which breaks the pellets down into soluble lead salts. These salts enter the blood stream and circulate throughout the bird's body. Their presence inhibits production of

hemoglobin (red blood cells) by bone marrow which, in turn, reduces the ability of the blood to carry oxygen and nutrients to body tissues. Commonly referred to as anemia, this condition results in the gradual atrophy (loss) of muscle and fatty tissue. The problem is further compounded because these lead salts also interfere with the breakdown of glucose and other carbohydrates, resulting in severe loss of weight.

If this weren't enough, the bird's nervous system is affected by the lead, and paralysis in the lower part of the esophagus results. Since the bird can no longer swallow, food impacts in the esophagus as the bird continues to feed. The hungrier the bird becomes, the more it eats, and the worse the impaction becomes. As the problem persists, external signs of lead poisoning become evident: drooping wings, inability to fly, and green staining of the vent area (produced by an accumulation of bile, the result of a malfunctioning gall bladder). With death a short time away, weakened birds become very thin and cannot walk or even stand. Death commonly occurs about three weeks after lead ingestion.

One almost universally accepted way to test for presence of a lead poisoning problem in an area is to examine waterfowl gizzards for lead shot.

Since the 1930s, researchers have examined gizzards from over 154,000 waterfowl. While they have found different ingestion rates for different areas of the country, as well as for different species, consistent patterns of poisoning have emerged.

Diving ducks, such as redheads or canvasbacks, show the highest ingestion rates; from 8% to 13% of these ducks are commonly found with lead shot in their gizzards. Dabbling ducks, such as mallards and pintails, consistently show a 7% to 9% ingestion rate, while other ducks with specialized feeding techniques show a less than 5% ingestion rate.

Not all birds that ingest lead die, so gizzard analysis represents only a minimum perspective of the lead poisoning problem. To get a better idea of the total number of waterfowl affected by lead poisoning, researchers sample other organs for abnormal lead levels. These studies indicate the real rate of exposure to lead poisoning is almost three times higher than the rate projected through gizzard analysis.

As significant as the number of ducks and geese succumbing directly to lead poisoning may be, lead's adverse effects on the nation's waterfowl may be greatest from sublethal doses of contamination. Researchers have linked these sublethal amounts to abnormal behavior, kidney and heart damage, and increased susceptibility to hunting, predators, and infectious disease.

If spent lead shot is so readily available and toxic to waterfowl, why aren't more lead-poisoned birds found in the wild? First, most losses occur in late winter through early spring. Spent lead shot is readily available from the just-concluded hunting season and, without hunters in the marshes, few people are around to observe the birds. Second, because they don't recognize lead poisoning symptoms, people often misidentify disabled birds as "cripples" from the previous hunting season or as starvation victims. Third, predators and scavengers quickly and continually erase on-the-ground evidence of the disease. In the latter stages of lead poisoning, the reduced mobility of poisoned waterfowl either makes them more vulnerable to predation or causes them to seek isolation and hide. From this point through death, there is continual elimination of affected birds by predators and scavengers such as coyotes, ravens, raccoons, and bald eagles. Nature's ability to clean up these dead or dying birds is impressive—up to 90% are scavenged within five days and more than one-half of them disappear entirely.

As serious as the problem of lead poisoning may be to waterfowl, these species are not the only forms of wildlife to suffer the consequences of lead shot ingestion. Secondary lead poisoning may occur in other species, including the predators and scavengers that feed on dead or dying waterfowl. The list of those birds of prey that have ingested lead pellets or died from lead poisoning includes prairie falcons, kestrels, red-tailed hawks, and eagles. In fact, research shows lead poisoning as a leading cause of death of endangered bald eagles, which ingest lead pellets while feeding on waterfowl carrying lead shot. According to USFWS records, as of April 1985, 114 bald eagles had died from lead poisoning, with the majority of deaths recorded since 1980.

A concern for these eagles was one of the chief reasons the National Wildlife Federation (NWF) filed suit against the USFWS in February of this year, with hopes of moving the federal waterfowl regulatory agency to ban use of lead shot for waterfowl hunting in the 48 contiguous states beginning with the 1987-88 season. To date, the USFWS has imposed non-toxic shot zones—banning use of lead shot by waterfowlers—only in specific locations where lead poisoning problems exist or areas that meet criteria established to protect bald eagles. The NWF suit contended that the USFWS and its parent Department of the Interior must require use of non-toxic shot for waterfowl hunting to comply with the Endangered Species Act, the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and the National Environmental Policy Act.

As this issue went to press in July, U.S. District Court Judge Edward J. Garcia, in Sacramento, California, had dismissed the suit, ruling that it was premature. Just before his ruling, the USFWS had made public a proposal to phase

Commission Adopts Steel Shot Regulations

Action taken by the Fish and Game Commission on June 25 will require use of steel shot for all hunting of waterfowl and coots in five Montana counties and two national wildlife refuges in the state this fall.

The U.S. Fish and Wildlife Service (USFWS), which authorizes all hunting of migratory waterfowl in the nation, has determined that by using steel (non-toxic) shot for waterfowl hunting, hunters could significantly reduce exposure to lead and annual loss to lead poisoning of up to 2 million waterfowl nationwide.

Based on several criteria, the USFWS had proposed that steel shot be used in Flathead, Lake, Sanders, Lewis and Clark, and Yellowstone counties, as well as the Red Rock Lakes and Benton Lake National Wildlife refuges, starting with the 1986 season. Through its June 25th action, the Commission adopted this proposal.

The USFWS had indicated it would not open those areas proposed for steel shot use to any waterfowl hunting if the Commission failed to adopt the steel shot restrictions.

In July, a federal judge dismissed a National Wildlife Federation lawsuit that sought a nationwide ban on lead shot for waterfowl hunting by 1987. The Commission action outlined above will not be affected by the decision. What the judge's action allows is a more gradual phase-in to non-toxic shot. The USFWS has indicated it plans to require a total phase-in by 1991; Montana's phase-in will probably be somewhat shorter.

in a nationwide ban on use of lead shot for waterfowl hunting by the fall of 1991. In dismissing the NWF suit, Judge Garcia further ruled that the Department of the Interior must order this phased-in ban on lead shot by the deadline proposed.

Finding an effective non-toxic substitute for toxic lead shot has been the focus of a great deal of research over the last three decades. As early as the 1950s, Dr. Frank Bellrose of the Illinois Natural History Survey was convinced that the solution to lead poisoning rested in developing a waterfowl hunting load containing non-toxic shot.

Many solutions to the problem have been offered: (1) combining lead with other substances to reduce its toxicity; (2) coating lead pellets with substances that do not break down in the gizzards of waterfowl; (3) using other non-toxic metals for the production of shot; and (4) combining lead with other substances that will make the shot dissolve in water. Any shot developed as an alternative to lead would have to be non-toxic to waterfowl and other wildlife, ballistically acceptable to waterfowl hunters, and economically feasible for ammunition manufacturers to produce.

To date, only one workable alternative to lead shot has been found: steel shot. All the other alternatives tested simply were not feasible to produce or were not effective in preventing lead poisoning.

It might seem that with development of an effective alternative for toxic lead shot, waterfowl hunters would be jumping for joy. This has not proved to be the case. In state after state, as use of steel shot has been planned and implemented, wildlife mangers and others professing the virtues of steel shot have been hit by a fusillade of questions and concerns regarding use of this new shot.

Many of the concerns are based on misinformation: Hunters have heard or read that steel shot may damage gun barrels, cause greater crippling losses, and cost significantly more than lead ammunition. Such unfavorable publicity has caused some waterfowl hunters to reject steel shot as an effective alternative to lead shot before they have fired even a single load of steel through their guns' bores. To set the record straight, let's address these concerns based on recently published information and facts:

Gun Barrel Damage

Early steel shot loads damaged *some* gun barrels. However, recent technological advances allow ammunition manufacturers to produce steel shot loads that have, for all practical purposes, eliminated bore erosion. The entire steel shot charge is enclosed in a new, tougher plastic shot cup that reduces contact between the shot and the inside of the barrel, thus preventing damage to the bore. Bore damage is no greater with steel than with lead and it rarely occurs.

However, steel loads and magnum lead loads may cause a slight expansion of the choke (ring bulge) in some tightly choked shotguns. This is due to the increased pressure and muzzle velocities required for optimum performance of these loads. Ring bulge usually does not affect the performance or the usable life of a shotgun. Hunters not sure if steel or magnum lead shot loads will damage their guns should contact the manufacturer or seek advice from a knowledgeable gunsmith.

Crippling Losses

Many waterfowl hunters are concerned about the possibility of increased crippling losses with use of steel shot. Steel shot weighs about one-third less than lead shot of similar size. Therefore, steel shot loses its velocity more rapidly and retains less down-range energy than lead pellets of equal size traveling at the same speed. Ammunition manufacturers have addressed this fact by designing steel shot loads to incorporate higher muzzle velocities. Hunters can further compensate for this drawback by using larger steel shot sizes. When coupled with the increased muzzle velocities designed into steel shot loads, doing so makes the ballistic performance of steel shot more comparable to that of lead.

MIKE GURNETT

Each year, up to 2 million waterfowl succumb to lead poisoning. By using non-toxic shot, waterfowl hunters can significantly reduce this loss.

A number of studies have compared the effectiveness of lead and steel shot under actual field conditions. Most of these studies conclude there is *no* significant difference in waterfowl crippling losses between the two types of shot. They also have confirmed that the increased muzzle velocity of steel loads *does* provide enough down-range energy to efficiently kill waterfowl.

To achieve about the same effectiveness from the new steel loads as from the traditional lead, all a hunter has to do is switch to a steel shot two sizes larger than the lead shot he previously used. For example, if a hunter used No. 4 lead for shots at passing ducks, No. 2 steel shot should give similar performance. Although there are fewer pellets in a standard No. 2 load than in a No. 4, the higher initial velocity and tighter patterning characteristics of steel make it hard for most waterfowlers to tell the difference. Hunters should experiment with various loads and preferred shot sizes to deter-

Lead poisoning affects the nervous system, eventually paralyzing the lower esophagus so the bird can no longer swallow. Death usually occurs in about three weeks. An emaciated breast with protruding sternum (below) is characteristic of a lead-poisoned bird (photos courtesy of Nebraska Game and Parks Commission).

mine loads best suited for their gun and type of hunting.

Difference in Shooting Lead and Steel Shot

Many waterfowl hunters will not notice any particular difference between shooting lead and steel shot. However, more experienced waterfowlers who are normally good shots may notice some differences. One important difference is that steel shot usually retains a much tighter, more compact, pattern and a shorter shot string than does lead shot. This is because steel pellets deform very little as they leave the barrel. Softer lead pellets deform much more easily, which causes patterns to "open up" and shot strings to lengthen.

Shooters using steel shot for the first time must learn to compensate for these pattern and shot string differences, as well as the increased velocity of steel shot at the muzzle, by reducing their lead for shots under 30 yards. Because steel shot loses its velocity more quickly than lead, they also must learn to increase their lead for shots over 50 yards. Leads are about the same for both types of shot in the 30- to 50-yard range.

Proper Choke Sizes

Hunters will find that barrels fitted or manufactured with improved cylinder and modified chokes perform better for the tighter, more uniform, patterns and shorter shot strings common with steel shot than do full choke barrels at ranges of up to about 50 yards. Nevertheless, a full choke may be the best choice for the average hunter for shots beyond 50 yards. Again, hunters should pattern their guns with various loads to check their gun's performance and to find the best loads for their particular type of hunting.

Cost of Steel Ammunition

Steel shot generally will cost more than most lead shot because of the higher costs of manufacture, the thicker shot cups, and the larger charges of special smokeless powder necessary to produce steel ammunition.

The price of factory-loaded steel ammunition is comparable to many of the buffered lead and magnum lead loads available. Some steel loads are ballistically equivalent to these lead shot loads. As steel ammunition becomes more widely used and the steel shot market stabilizes, prices are expected to become more competitive.

Reloading

Reloading your own steel shot shells saves roughly half the cost of purchasing factory shells. Components and reloading data for steel shot shells are available from several sources, although components are not yet widely available. It is extremely important that reloaders use the components listed and follow directions precisely due to the higher chamber pressures associated with steel loads. Substitutions or changes from those recommended can result not only in excessive pressure, but also in damage to firearms and injury to the shooters using them.

The Department's Position

The Montana Department of Fish, Wildlife and Parks supports the conversion to non-toxic (steel) shot for waterfowl hunting because it believes the continuing deposition of toxic lead into the environment—when a suitable non-toxic substitute is available—would constitute poor management of the wildlife resources involved.

For 1986, the USFWS, which sets an outside framework within which the states establish more specific seasons and bag limits, proposed that the five counties and two national wildlife refuges listed at the beginning of this article be converted to steel-shot-only waterfowl and coot hunting. These areas meet the service's criteria of having an annual harvest of over 5,000 waterfowl and a minimum wintering population of 25 bald eagles. Other non-toxic shot areas will be added in coming years until non-toxic shot is required for all waterfowl hunting in the state.

The plight of North America's waterfowl resource has been well documented. Over 50% of the continent's historical wetlands have already been lost, and we continue to lose nearly one-half million acres of marsh and wetlands each year.

National and state conservation organizations and agencies have been working to produce more waterfowl on the remaining habitat—but these efforts have their limitations. So, it is imperative that we strive to reduce waterfowl losses from other causes. One such cause, lead poisoning, can be reduced more easily than any other non-hunting cause of mortality.

By using non-toxic shot for waterfowl hunting, hunters could significantly reduce loss to lead poisoning of up to 2 million waterfowl annually. With support and understanding of the need for this change in the hearts and minds of waterfowlers throughout Montana, the state's waterfowl will ultimately be the beneficiaries. ■

CONTRIBUTORS

• A group of public and private utilities, federal agencies, Indian tribes, and state agencies went "In Search of a Better Balance" between energy production and natural resource management. And the reason it became possible was a bit of unorthodox thinking and congressional compromise called the "Pacific Northwest Electric Power Planning and Conservation Act of 1980." Turn to page 2 for another of **Mike Aderhold**'s engaging explorations of complex issues. Mike continues as the department's information officer in Kalispell.

• **Robert A. Kercher**'s serigraphs, "Trout Waters" and "Lake Country Fantasy," illustrate Mike's article. The viewer is often surprised as the subjects change from shape to shape with little variation in tint or hue. Bob devotes all of his time to art and his studio is also his home, 108 Riverview 7 West; Great Falls, MT 59404 (406/-452-3740). His work has been featured in top state and national shows, and over 1,000 of his pieces hang in private and corporate collections—including that of President Ronald Reagan.

• "Green is for **GO**." And the "Green Dot Program" is a road closure program that is easy to put in place and easy to maintain; it is simple and positive, emphasizing opportunity and OPEN roads. If you see a series of flexible posts with green reflectors near the top, you're on a road system OPEN to vehicle traffic. To learn more about this cooperative means of travel management and its effects on wildlife habitat and distribution, turn to page 8. **Jim Cross** is the wildlife manager for Region 2 (Kalispell). He has worked as a biologist in the Bitterroot and Blackfoot, as well as in Kalispell.

• There's no doubt that **Robert Neaves** prepared the illustration especially for Jim's article. No stranger to our pages, Bob's work continues to attract widespread acclaim. His painting of three bighorn sheep was the wrap-around cover of *Wyoming Wildlife's* 50th anniversary issue. In October, he will be the "featured western artist" at the Iowa Wildlife and Western Art Show. For more information, contact him at his studio, Western Images, 730 Hamilton Heights Road; Corvallis, MT 59828 (406/961-4808).

• Different colored slips, stamped linen cards, wallet-sized folded paper. These are all part of Dutch Braunlich's collection of more than 70 years of hunting and fishing licenses. But there's also almost three-quarters of a century of stories and reminiscences of outdoor life in the dog-eared paper, and **Michael Korn** shares a few of them with *MO* readers. Korn is director of the Montana Folklife Project. His self-described passion for hunting and fishing and his preoccupation with history made Dutch's stories and collection irresistible. Turn to this issue's best advice—"Love Nature...And Be a Gentleman"—on page 11.

• Radio telemetry isn't an impossible concept, replete with hard-to-pronounce words and lots of numbers. Rather, it's a "Bleep...Bleep...Bleep" that allows biologists to locate individual animals as often as necessary. They can also gather more information more quickly, and so it results in better management of many wildlife species. Turn to **Phil Schladweiler's** article on page 15. He has worked with wildlife radio telemetry since 1962, and is a wildlife research biologist with the Wildlife Division's Research Laboratory in Bozeman.

• "Discover Reloading"—"Rolling Your Own For Fun and Profit." That's a suggestion from **Dennis Flath** and he begins telling you why on page 19. Reloading is a natural parallel hobby for those who love to shoot because they can save themselves some money and also tailor the load to a particular gun's idiosyncrasies. Flath is a nongame biologist with the Wildlife Division's Research Laboratory, Bozeman.

• **Gerry Schroeder**'s article tells you about "Re-Creating with the 'Right Stuff.' " The "right stuff" in this case is what a hunter needs to do after he's downed an animal he intends to have mounted. Schroeder lists heat, blood, and damaged hair as the three most common threats to your trophy, and tells you precisely how to minimize damage in all three areas. A guidance counselor in the Bozeman public school system, Gerry is wild about hunting, fishing, and taxidermy, not necessarily in that order. His article begins on page 24.

• No, *MO* hasn't begun running a list of hit tunes ("Last in the Charts, But Not Least in Our Hearts"). Nor has **Wade Fredenberg** become a disc jockey. But he does note the fish he believes to be Montana's least glamorous—the sculpin. It has fat lips, fins huge for its body, and no neck. Plus, it's too small to eat. And consider the five varieties: mottled, torrent, shorthead, spoonhead, and, of course, slimy. As Wade suggests, "It's a good thing they're small, because a four-foot slimy sculpin would be something to behold." Fredenberg—whose article on the Bighorn (July/August 1983) won first place in an international competition conducted by the Association for Conservation Information, Inc.—is a department fisheries biologist, concentrating on the Bighorn and Musselshell rivers. Turn to his "Perspectives" on page 27.

• "When waterfowl hunters in several areas of Montana take to their blinds this fall, they'll not only be taking shots *at* ducks and geese, they'll be taking a shot *for* them as well. That's because these waterfowlers will be among the first in the state required to shoot shot shells loaded with 'The Non-Toxic Steel Solution.' " **Don Childress** and **William Phippen** go on to look at the problems with lead shot and its effects on waterfowl, crippling losses, the question of steel shot loads damaging gun barrels, the differences in shooting lead and steel, and a cost comparison of the two. Turn to their review of this controversial subject, beginning on page 28. Don was recently named assistant administrator of the Wildlife Division; Bill is the Helena information officer, Conservation Education Division.

• **Mike Hollern**'s love of hunting and fishing is reflected in his art, as you can see in the mallards etching that accompanies the "steel shot" article. A printmaker and sculptor, Mike recently received honorable mention at the National Birds of Prey Show in Boise, Idaho, for an etching of two peregrines. He lives in the midst of the beautiful Missouri River Canyon, which provides a backdrop for much of his work. For more information, contact him at his studio/home, P.O. Box 1; Great Falls, MT 59403.

• "Growler" is a story to howl about. **Charles D. Eustace** looks at the oft-told tale of bear trapping, darting, tagging, collaring, tooth-pulling, etc. But he does so through the bear's eyes, as well as through the biologists'. It even ends happily: The biologists amble down the canyon, and Growler ambles up the ridge. Charlie is the Region 5 (Billings) wildlife manager, and he does a pretty fair job of managing words as well. We think you'll agree, after you read his effort, beginning on page 34.

• The inside front cover was prepared especially for us by **Dave Maloney**, Great Falls. He has won national and international awards for his art, including recognition as the National Ducks Unlimited Sponsor Artist of the Year (1986) for Montana and Wyoming. He works from his studio/home, 704 Grizzly Drive; Great Falls, MT 59404 (406/452-9605).

• Special thanks to the following photographers: **R.L. Eng**, Bozeman; **Bill McRae**, Fairfield; **Dave Neil**, Great Falls; **William K. Vinje**, Minot, N.D.; and to these photographers who work for the department: **Mike Gurnett**, Helena; **Terry Lonner**, Bozeman; and **Bill Pryor**, Billings.

GROWLER

BILL PRYOR

The unexpected diverts and rivets attention away from endless routine, sometimes elevating curiosity above caution. So it was with Growler.

Growler, a muscular, 230-pound black bear, was ambling down the broad, boggy back of a lateral moraine shoved up by glacial action thousands of years past. Stopping occasionally to rub his broad rump against the bark of a Douglas-fir, Growler tested the heavy, cool evening air as it settled over the canyon walls.

Just a few weeks before, in the early days of April, Growler had wormed his way through an impossibly small tunnel leading from his den, 20 feet under a house-sized boulder, to a steep, timber-covered slope at the 8,000-foot mark on Squaw Peak. Here, in south central Montana's Beartooth Mountains, the blanket of snow was still several feet deep, and it would be many weeks before the hardy shooting stars and buttercups would appear at the edge of melting snowbanks. The past five months of peaceful slumber had melted away the last vestiges of the fall fat which had encased Growler's frame when he had been suddenly prompted by howling blasts of Arctic air, and snow too deep for easy navigation, to seek his den in mid-November.

Now, on the valley floor where spring green-up was just under way, Growler patrolled the rock slides. He nipped the early offerings of cheatgrass, dandelions, and buttercups brought out by heat radiating off the rock talus, nature's solar collectors. In the ensuing days, he roamed the rolling south-facing hillsides, picking up the tender new shoots of grass and green onions. As the days lengthened and warmed, Growler wound his way through moist patches of white-barked aspen and small meadows, strung like beads through the heavy timber along the East Boulder River.

Here, Growler met the unexpected. The dense evening air carried the irresistible aroma of a bruin's favorite spring delicacy—ripe carrion. Succulent grass and sweet-smelling flowers are one thing, but oh the pleasurable memories that returned as Growler's quivering nostrils sucked in deep lungfuls of this poignant vapor. Gone was the aimless wandering which had marked his meadow meanderings. Using his finely tuned sense of smell, Growler vacuumed the air for clues to the whereabouts of this enticing spring elixir. Moving purposefully, he discovered the strong signal came from a narrow band of grass which led to a clump of trees at the meadow's edge. It seemed as if the spring tonic, which was making his mouth water uncontrollably, had been drug across the grass. Approaching the timber, Growler located the source of his affections in a V-shaped cubby of pine logs nestled under three lodgepole pines.

Since he hadn't seen this log cave on his previous excursions, Growler dug his sharp claws into a nearby aspen and began to climb up the slender trunk for a better view. With each bite of his claws, a broad semicircle of dots punctured the soft, white bark; the dots would turn black as the wound created by each claw healed, leaving a permanent chronicle of his climb.

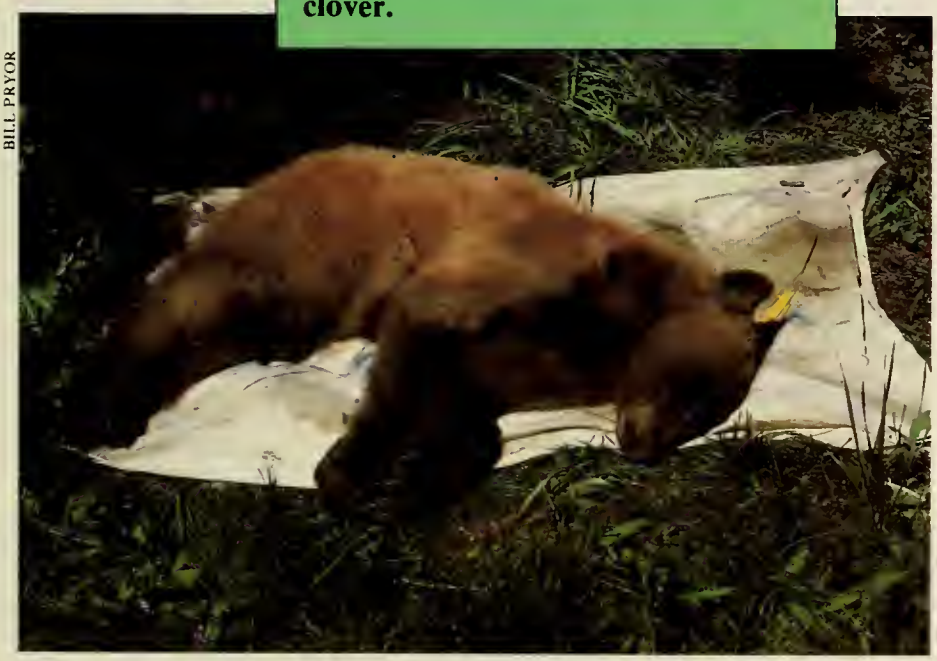
From his crow's-nest perch, Growler could see the entire log cave. Large piles of brush enveloped the sides, rear, and top of the cave, and the only entrance he could see was at the mouth. Even this was crowded with a maze of vertical stakes, leaving only a narrow opening. Having assured himself there was nothing unnatural about this unfamiliar pile of logs and brush, Growler bounded down the aspen in short drops. With each bound, the tug

by Charles D. Eustace

BILL PRYOR

Growler had been lured into a black bear snare set by biologists Claire Simmons and John Mack. As they measured his foot, Growler dreamed peacefully about meadows white with clover.

BILL PRYOR



of his 230 pounds was so great that his crescent-shaped claws plowed short furrows in the soft aspen bark. In time, these too would heal into dark scars.

Growler approached the dark mouth of the log cave and curiously examined the narrow opening. Partially obscuring the narrow opening was a stake slanting up to his right, and directly behind the slanted stake was a bare patch of earth about two paw-lengths long. In front of and behind this bare patch lay two small logs that he would have to step between to reach a haunch of overripe deer he could dimly make out in the back of the cave.

The fragrance of sun-ripened venison overcame any remaining reservations. Ignoring the din of several hundred buzzing houseflies, Growler stepped over the slanted stake and placed his left front paw squarely on the bare patch of earth between the two small logs. As Growler's full weight shifted to his left front paw, there was a sound of snapping twigs and the ground under his paw gave way, followed instantly by an explosion of dirt around his head and chest. Lunging back quickly, he felt a cable tighten around his left leg just above the paw.

Unwittingly, Growler had walked into a black bear snare set by Department of Fish, Wildlife and Parks biologist Claire Simmons. Not used to being restrained, Growler snapped at the cable and began to run back the way he had come. After only two or three short bounds, he found himself jerked to a halt, and noticed that when he pulled hard on the cable, a large log about 10 feet behind him followed wherever he went. Growler, whose flash point was 20 degrees below that of ether, instantly took to a nearby lodgepole pine in an effort to evade the errant log that mysteriously followed his every move. Ten feet up the lodgepole, Growler once again found himself stopped by the persistent cable. Although he could easily lift the 200-pound log off the ground, it was an unwelcome nuisance.

If Growler was vexed before, he was truly mad now; all reason vanished as the hapless lodgepole became a whipping post. In a matter of moments, the thin, brown bark six or seven feet up and down the trunk lay in tatters at the base of the lodgepole. He ripped fist-sized chunks of wood from the trunk and spit them out as fast as his steel-muscled jaws could snap.

Such a rigorous workout soon tires even the best of fighters. The lodgepole, haplessly selected by fate to assuage Growler's rage, was only too glad to see him slip to the ground in a disheveled heap, accept the inevitable, and curl up next to the tormenting log,

sinking slowly into an exhausted slumber.

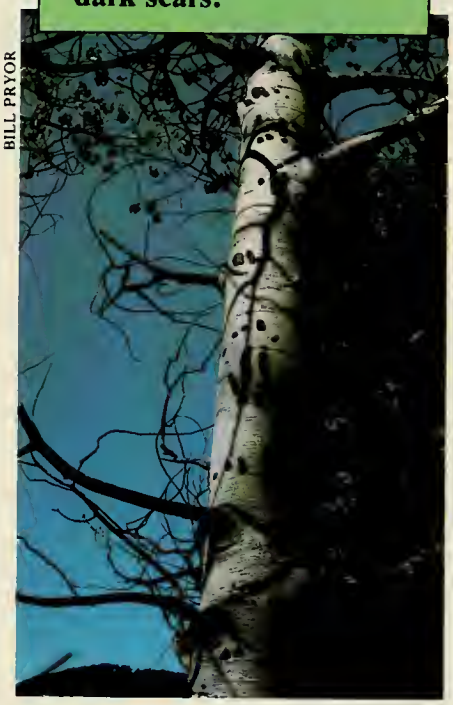
It was 2 a.m. when Growler stirred; an early riser, he liked to be about long before the first birds announced a new day. Several tugs on the cable reminded him of his perplexing situation and he grudgingly settled down next to the log. Growler watched the dawn come and go. The sun had cleared the eastern ridge several hours previously when he sensed the presence of man coming down a game trail to his right. Little did Growler suspect that in a matter of minutes he would truly be a "marked bear."

Approaching the trap site, Claire Simmons was the first to spot Growler lying quietly in the shade. Accompanying Claire was John Mack, a graduate student from Montana State University, who was studying black bears under a grant from the Houston Safari Club of Houston, Texas. After setting their backpacks down some distance from Growler, Claire and John cautiously approached, trying to determine where the log drag was and Growler's approximate weight. They also scanned the surrounding timber for sign of any other bears which might be in company of the trapped bear, particularly if the trapped bear turned out to be a sow or cub.

Satisfied that Growler was alone and having estimated his weight, Claire and John retreated to their packs. John assembled a blowgun, while Claire loaded a tranquilizing dart. While most black bears have no desire to encounter humans and draw back behind a tree or climb it to escape, Growler was an exception. He exhibited just as much interest in handling his antagonizers as they did in handling him! Extreme caution was therefore in order. Claire was careful not to make quick movements or loud noise, or to get too close. Placing the blowgun to his lips, he targeted Growler's ample rump. He expelled a sharp blast of air, propelling the dart about 30 feet and embedding it securely in Growler's backside. The bear paid little attention to the dart, and Claire and John once again returned to their packs to prepare the rest of their equipment, while the sandman lulled Growler to sleep.

John removed a radio collar from his pack and recorded the transmitter frequency. This transmitter would allow John to distinguish Growler from the other 18 bears which would wear radios that year and to map their travels throughout the Beartooth Mountains. By following the radio-collared bears, John could determine how big an area it took to support a bear throughout the year and what portions of that area were most important.

Growler's crescent-shaped claws plowed short furrows in the soft aspen bark. In time, these would heal into dark scars.



BILL PRYOR

Changing times had made this kind of information more and more necessary. Mining corporations were examining valuable mineral deposits in the Beartooth Mountains for possible extraction. Timber harvest, which had been at a low level for many years, was increasing; along with timber harvest come roads necessary to remove the timber. Hunter awareness of the black bear as a sporting opportunity had doubled in the past 10 years. If a successful management program was to be developed which would compensate for increased demands on the black bear and its habitat, biologists had to have a grasp of two very important factors. First, what were the characteristics and extent of the resource they were trying to manage? How many bears were there? How fast did they multiply? How did they use the habitat available to them? Second, what factors limited the bears' success in maintaining, or even increasing, their numbers?

Both John and Claire had discussed these questions many times before, knowing it was essential to answer them to the best of their ability before they could provide direction for maintaining the bear population or changing conditions which limited the number of bears and their distribution.

Once the necessary equipment was assembled, Claire and John returned to find Growler peacefully dreaming about meadows white with clover. The first task was to remove the snare from Growler's front leg. Then they placed a radio collar on Growler's neck—not always an easy trick with an adult boar, since this was the breeding season and Growler's neck was swollen like that of a buck deer in rut. On several occasions, Claire had found the circumference of the neck greater than that of the head. This required that the padded radio collar be adjusted snugly. Claire often commented that ears were the only thing that kept some radio collars from falling off, and some bears, like the one he called Houdini, were quite adept at escaping from their collars. Houdini, in particular, liked to leave his radio at the trap site after waking up.

Once the collar was on, Claire and John removed a small premolar tooth which would be used to determine Growler's age. After a portion of the tooth root is properly cut and stained, age growth rings can be counted as they are on a tree stump.

Next, the two biologists placed an ear tag with colored streamers in Growler's ear, and they weighed and measured him. Their last duty was to place Growler in a comfortable position in the shade and place special drops in his eyes to keep them moist until he awoke, since the eyes of a tranquilized bear are constantly open.

Once this was done, Claire and John quickly packed all their equipment and left for the next trap site. They never cared to wait around for the bear's

critique of their skills in pulling teeth or tagging ears.

They checked their remaining traps, without incident, and then shared some of the clues they were beginning to piece together in the bear puzzle. Western black bear sows generally don't breed before they are 4 or 5 years old. In some cases, it may be longer. Just this past winter, they had pulled Kasey from her den to replace her radio collar. Kasey was 8 years old, but still had not produced any offspring. If she bred in June, the two-pound cubs wouldn't be born until February, and Kasey would be 9 years old. She would be 11 before she could be expected to produce a second litter, and 12 was more likely.

Claire knew he must maintain a healthy number of older sows in the population, but recent increases in hunting pressure had been eroding the reservoir of mature sows. Not that there weren't any left. As he told John, the oldest sow he had recorded was 22, while the oldest boar was 21. But Claire knew these were the exception, not the rule. If present trends continued, he would likely have to consider recommending more restrictive hunting regulations.

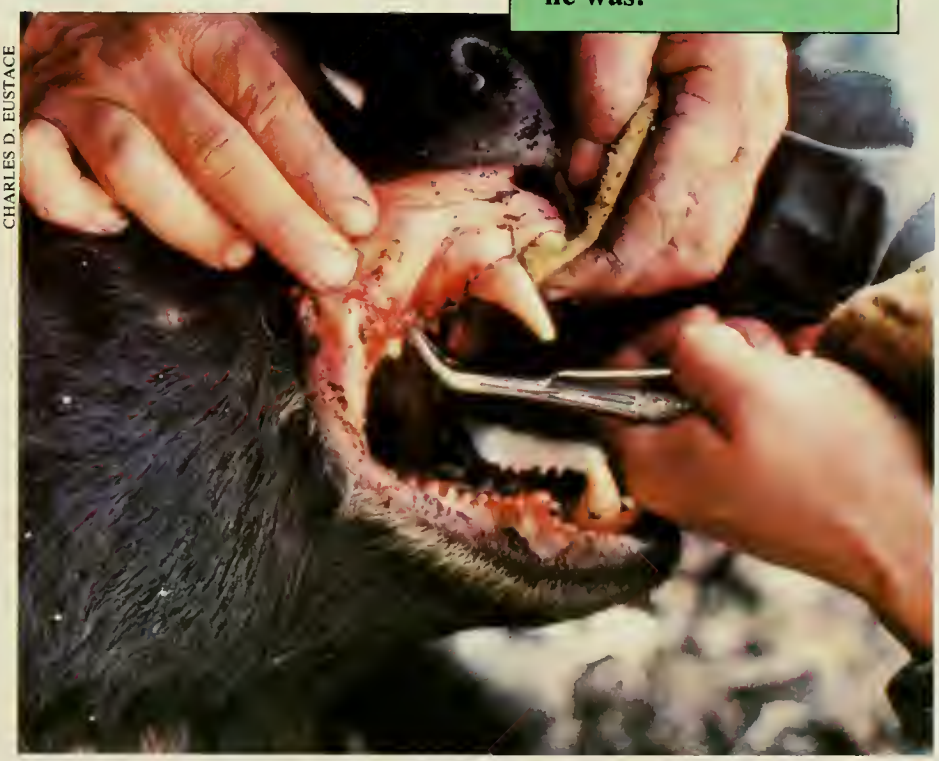
John told Claire of a new berry field he had come across the previous fall. The large patch of hawthorn, chokecherry, and serviceberry had been strewn with bear droppings laced with berry pits. Studies elsewhere show that fall food supplies, which account for much of the fat a bear wears into the den, also directly affect the sow's success in producing cubs. Although sows breed in June, the fertilized egg does not attach to the wall of the uterus until fall. Sows with adequate layers of fat in October have a better chance of emerging from the den with cubs in spring than those entering the den with low fat reserves. The question that John kept coming back to was: Could berry production be increased by selectively creating openings in timber in areas most likely to support berry patches?

Claire and John could have continued to share thoughts for hours, but the lowering sun and the cool evening air told them it was time to return to their vehicle down the canyon. As they crossed one of the many small meadows lining the valley floor, a particularly fresh bear scat caught Claire's eye. Because they wanted to learn more about bear food habits, Claire and John spent several minutes scouring the area with the excitement of two pearl divers in a virgin oyster bed. They bagged and tagged their newfound treasure, and continued on their path down the canyon.

Unobserved by either Claire or John, two eyes were curiously studying their every move from a nearby ridge. An odd bunch, these biologists, mused Growler to himself. First they tied me to a log, blew a dart in my rump, strapped this darn collar on my neck, pulled my tooth, measured my foot, and hung a ribbon in my ear! As if that weren't enough, now look at what they're picking up in the meadow! An odd bunch indeed, repeated Growler, as he turned to amble up the ridge. ◼

Growler had to give up a small premolar tooth, so biologists Claire Simmons and John Mack could tell how old he was.

CHARLES D. EUSTACE



• *The author expresses sincere appreciation to the Houston Safari Club of Houston, Texas, and the Montana Chapter, Safari Club International, for their generous financial support of graduate level black bear studies in the Beartooth Mountains. Without the support of sportsmen's organizations such as these, our knowledge of black bear biology and bear habitat requirements in south central Montana would be considerably less than it is today.*—Charles D. Eustace